DECEMBER 1952

PIT AND QUARRY

In this Issue . . .

40th National Safety Congress • North Jersey Quarry Stresses Public Relations • Limestone Produced by New Arkansas Plant for Alumina Manufacture • Newest Cement Plant in Canada Continues Expansion • Stripping Problem at Dunham-Stephens Solved by Special Processing

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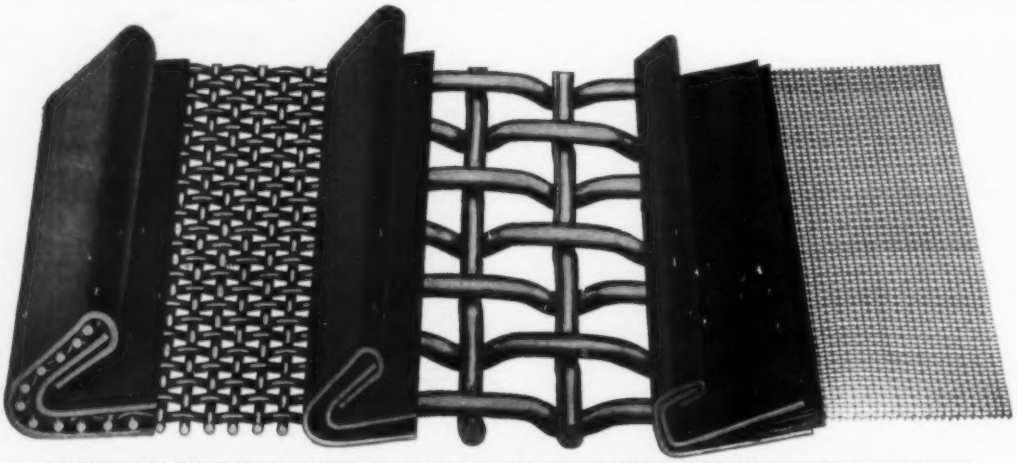
Amid Snow and Pines at a Fluorspar Mine in the Rockies

STA-SMOOTH ARCH-CRIMP

SUPER-LOY VIBRATING-SCREEN SECTIONS

SUPER-HARD - - - SUPER-TOUGH - - - SUPER-STRONG

SUPER-LOY SCREENS are made from a high carbon steel specially alloyed to withstand abrasion longer — endure vibration better — resist fatigue to the utmost



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THE LUDLOW-SAYLOR WIRE COMPANY

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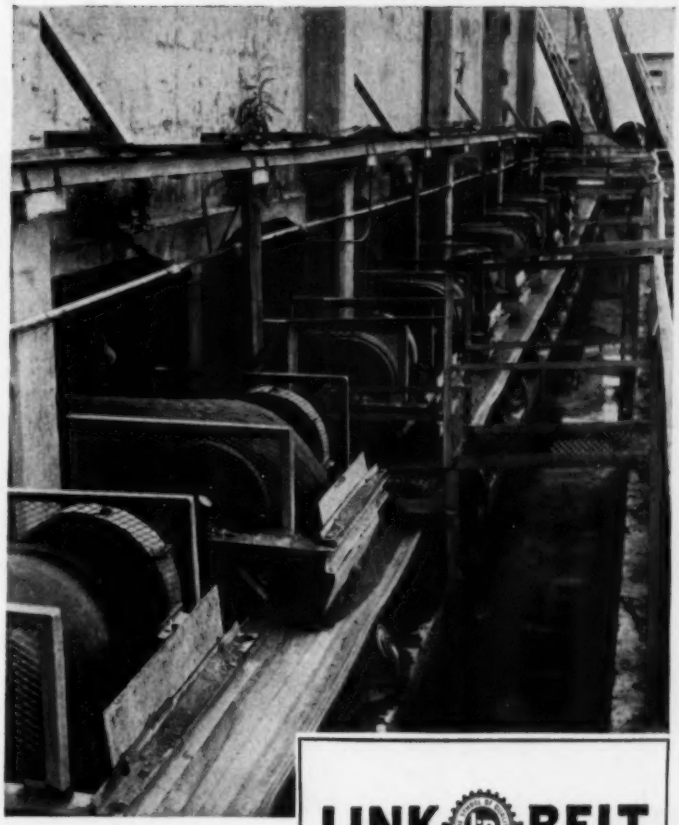
LINK-BELT engineering experience plus quality components combine to cut handling costs

Yes, in plants everywhere, Link-Belt is first choice in belt conveyors. Whether your job is large or small, Link-Belt can apply unequalled engineering experience to meet the conditions of your particular system.

Link-Belt builds a complete line of quality components. Our conveyor engineers can choose from all types and sizes of idlers, trippers and terminal machinery to match your exact requirements.

Link-Belt can also supply all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures . . . install the job completely if desired.

Link-Belt will gladly work with your engineers or consultants. Get in touch with your nearest Link-Belt office.



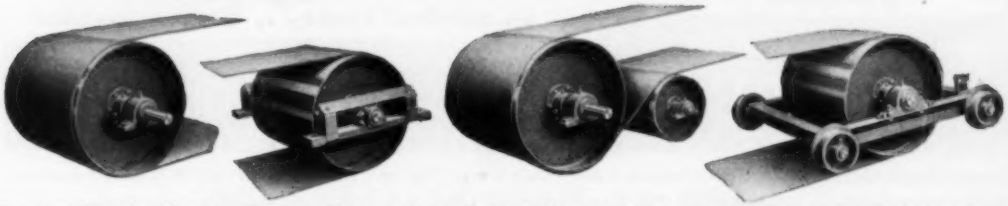
L-B collecting belt conveyor receives wet phosphate rock from 13 belt feeder-conveyors under storage bins. Eleven of feeder-conveyors are reversible.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,747-D

LINK-BELT Pre-Selected Terminals—the right equipment for every requirement



Terminal with single pulley drive **Terminal with screw take-up** **Terminal with snubbed pulley drive** **Terminal with counterweighted take-up**

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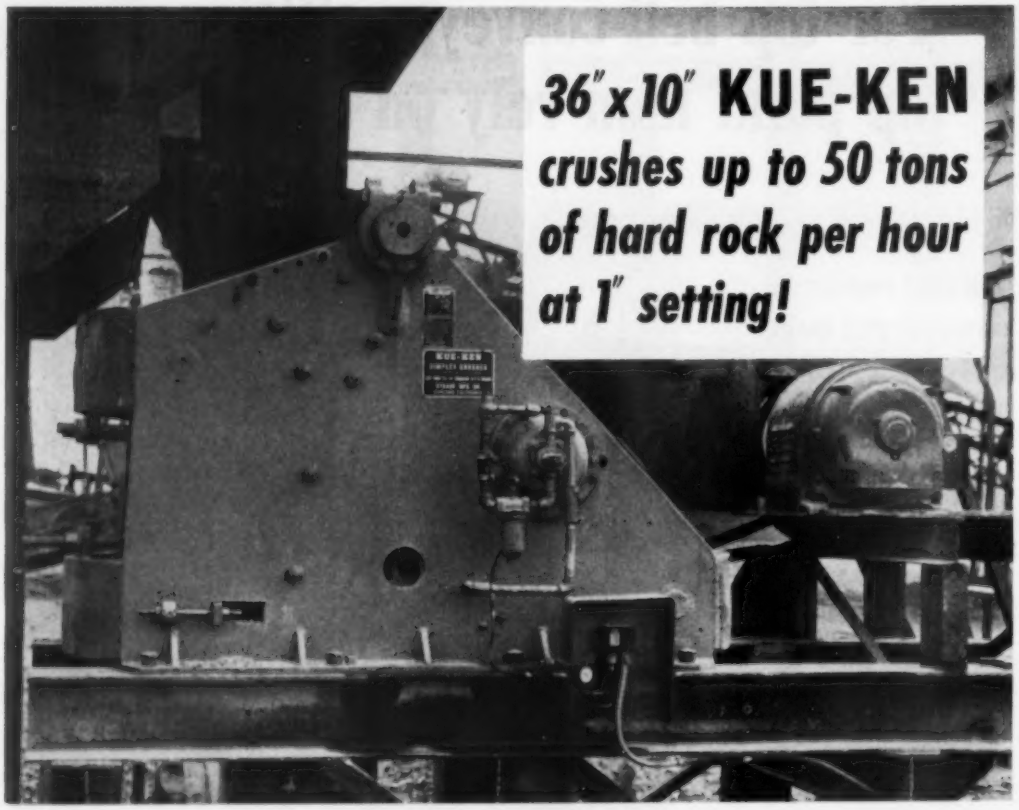

If you're interested in high capacity crushing, it will pay you to investigate KUE-KEN. Delivering 375 crushing strokes per minute, (25 to 50% more than any other crusher), KUE-KEN gives you the highest capacity crushing available today.

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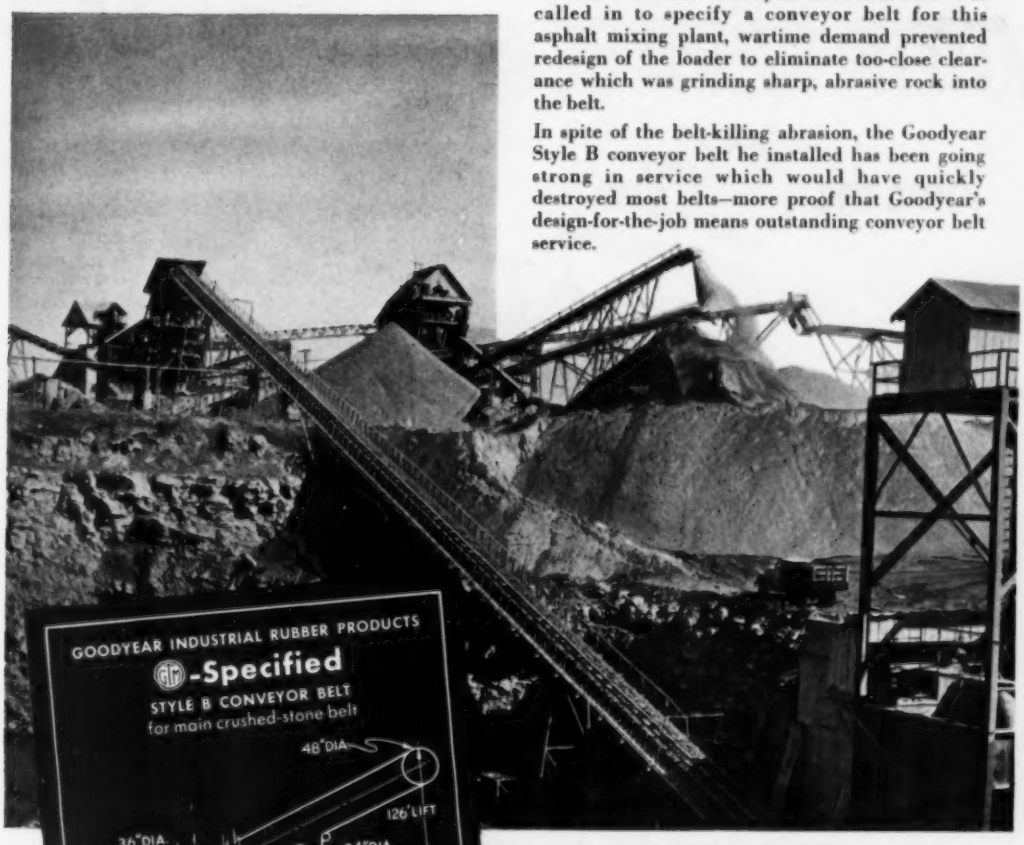
3,500,000-plus tons *and still going strong!*

When the G.T.M.—Goodyear Technical Man—was called in to specify a conveyor belt for this asphalt mixing plant, wartime demand prevented redesign of the loader to eliminate too-close clearance which was grinding sharp, abrasive rock into the belt.

In spite of the belt-killing abrasion, the Goodyear Style B conveyor belt he installed has been going strong in service which would have quickly destroyed most belts—more proof that Goodyear's design-for-the-job means outstanding conveyor belt service.



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TW-300 MOTOR WAGON
Bottom Dump
14 cu. yd. struck capacity
280 hp.

Now... the famous MOTOR SCRAPER joins the A-C line

TR-200 MOTOR WAGON
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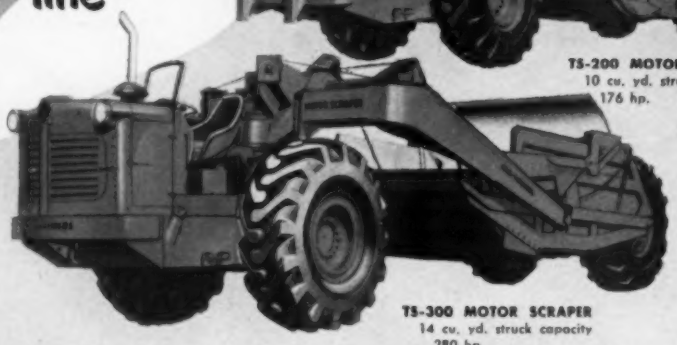
176 hp.

TS-200 MOTOR SCRAPER
10 cu. yd. struck capacity
176 hp.



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280 hp.

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In order to serve you more completely, Allis-Chalmers has extended the *Finest Line on Earth* by adding the famous MOTOR SCRAPERS and MOTOR WAGONS formerly manufactured by LaPlant-Choate. This customer-accepted line meets A-C's 4-point quality requirements in every way.

These big self-propelled units are *designed for your job* . . . easy loading, high-speed hauling and quick, clean ejection. They're *built to take it* . . . job-tested, job-proved through years of use all over the world. Like Allis-Chalmers' other earth-moving equipment, the MOTOR SCRAPER is *easy to operate . . . simple to service.*

Today's jobs require a more careful selection of equipment. That's why you'll be money ahead if you make your nearby industrial A-C dealer your headquarters for crawler tractors, motor graders, MOTOR SCRAPERS and MOTOR WAGONS. Stop in soon to discuss your job requirements and see his complete parts and service facilities.

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Practical Assistance

Whether it's a tight squeeze in a cookie jar or a bottleneck in your quarry operation . . . practical assistance—the kind that solves the problem simply and fast—is your best answer. And ***PRACTICAL TECHNICAL ASSISTANCE*** is a *Cities Service specialty.*

Cities Service Lubrication Engineers can offer *practical assistance* that will eliminate bottlenecks caused by faulty lubrication . . . will mean dollars, man-hours and equipment saved. They're specialists in the industry's most effective lubricating practices. In addition, they offer the most complete line of Cities Service quality lubricants.

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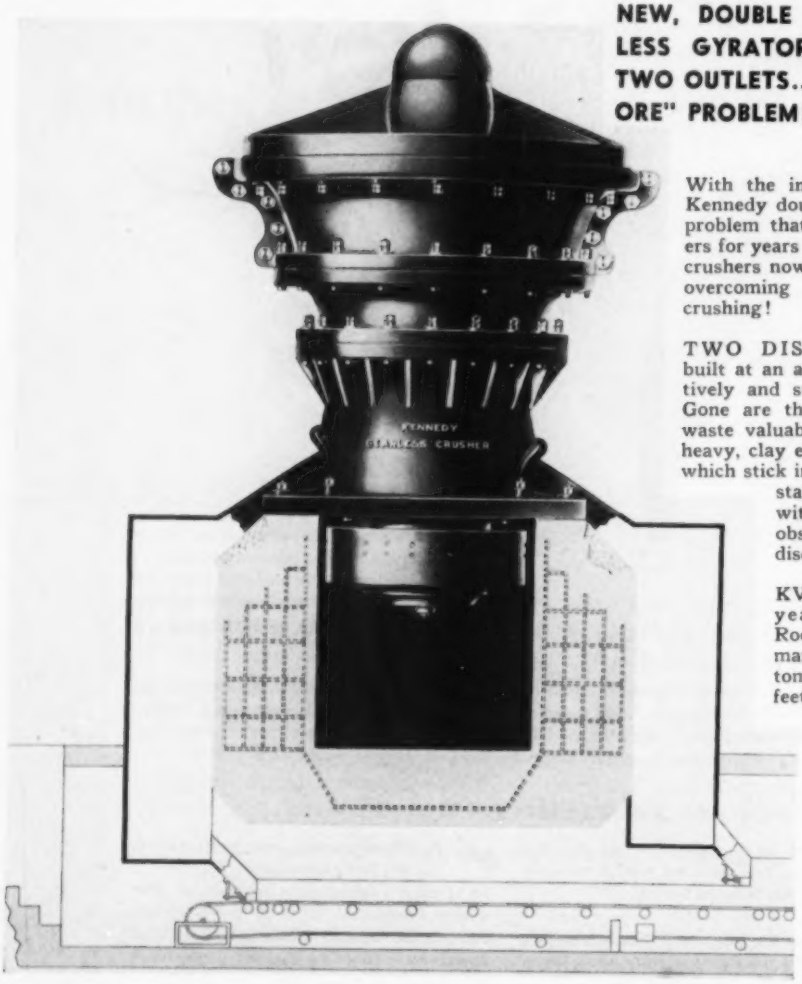
✔ Check the complete Cities Service line for the lubricant for every need. Deliveries are quick—and dependable.

✔ And finally, discuss your problems with a Cities Service Lubrication Engineer . . . he's probably solved many like them for other quarry operations. Write or phone CITIES SERVICE OIL COMPANY, Dept. L-21, Sixty Wall Tower, New York City 5 . . . or get in touch with the office nearest you.

CITIES SERVICE

KENNEDY PRESENTS THE *IN GYRATORY CRUSHER*



Cut away drawing of crusher showing double discharge outlets, Welland Canal feeders and continuous belt mechanism for steady flow of material.

NEW, DOUBLE DISCHARGE GEARLESS GYRATORY CRUSHER WITH TWO OUTLETS...ENDS THE "STICKY ORE" PROBLEM!

With the introduction of the NEW Kennedy double discharge crushers, a problem that has baffled manufacturers for years has been solved. Kennedy crushers now provide a sure means of overcoming sticky, clay-clogged ore crushing!

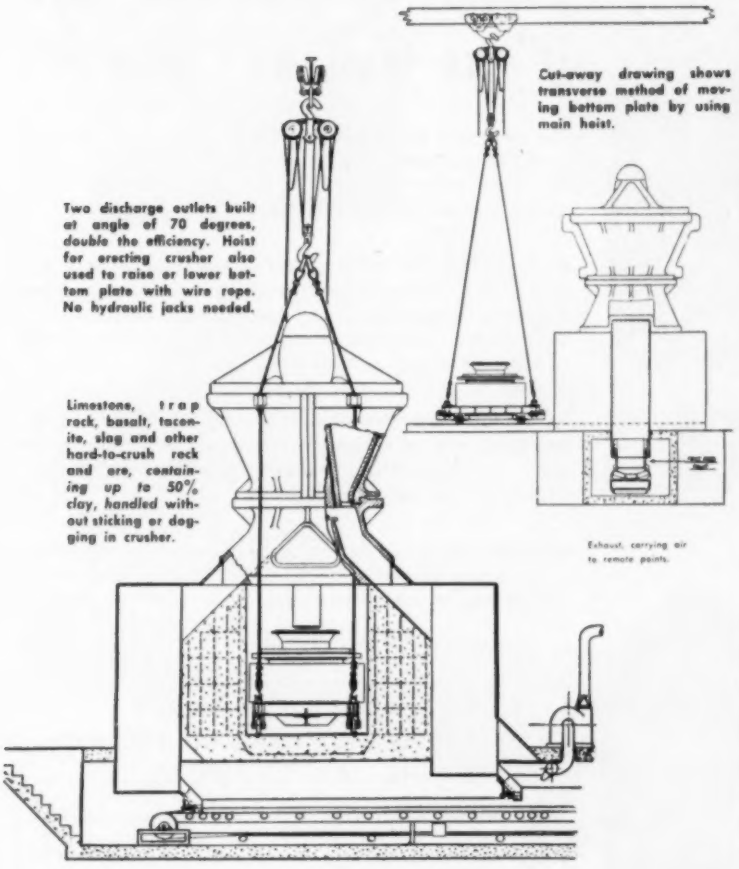
TWO DISCHARGE OUTLETS, built at an angle of 70 degrees, effectively and surely eliminate clogging. Gone are the days when men must waste valuable time prying loose the heavy, clay encumbered rock and ores which stick in the discharge vents and stall those crushers built with only one outlet and obsolete 43 degree angle of discharge.

KVS crushers represent years-ahead engineering. Rock and ores pass through mantle and concaves at bottom. A vertical drop of 6 feet then quickly and positively disgorges sticky material. Limestone, trap rock, basalt, taconite, slag, etc., containing as high as 50% clay, can be handled without clogging by this radically improved KVS process.

SEND FOR LITERATURE DESCRIBING ALL MODELS OF KVS CRUSHERS.

GREATEST IMPROVEMENT

PERFORMANCE IN A GENERATION!


Cut-away drawing shows transverse method of moving bottom plate by using main hoist.
Two discharge outlets built at angle of 70 degrees, double the efficiency. Hoist for erecting crusher also used to raise or lower bottom plate with wire rope. No hydraulic jacks needed.
Limestone, trap rock, basalt, taconite, slag and other hard-to-crush rock and ore, containing up to 50% clay, handled without sticking or dogging in crusher.
Exhaust, carrying air to remote points.

FEATURES THAT DISTINGUISH THE KVS GYRATORY CRUSHERS

Synchronous motor built into pulley assembly.

Smooth, frictionless operation because crusher is gearless.

Power used ONLY for crushing

All moving parts carried on self-aligning roller bearings. KVS forced-feed oiling system pumps four barrels of oil per hour through bearings without waste.

Eccentric and ball spray babbitted. NONE has been rebabbitted in over five years.

IT COSTS LESS.. TO OWN THE BEST!

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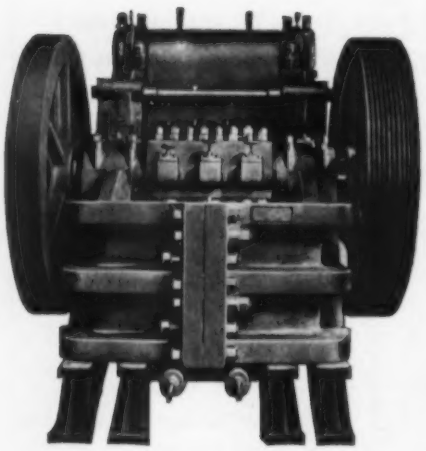
YEARS-AHEAD ENGINEERING...

2-Section Split Frames of Heculite Steel built to "take it" as well as "give it"



The strongest heavy-duty crushers ever built! Designed by KVS engineers to handle maximum rock and ore loads . . . built to reduce those "Hard-to-Crush" raw materials with minimum effort and lowest power consumption.

Real gluttons for work . . . versatile, sturdy, ready and able to handle the toughest crushing assignment and ask for more! Dependable under all operating conditions . . . trouble-free . . . constructed to give years of service . . . able to "take it" as well as "give it".

Swing Jaws are reversible, end-to-end, side-to-side, to give twice the wear of ordinary types. Jaw plates made in one piece; swing jaw shafts cast integral with swing jaws . . . excessive wear eliminated.

All-in-all, the strongest jaw crusher built. Made in various sizes to meet your own specifications. Ask our engineering department to submit operating data, capacities, weights, etc.

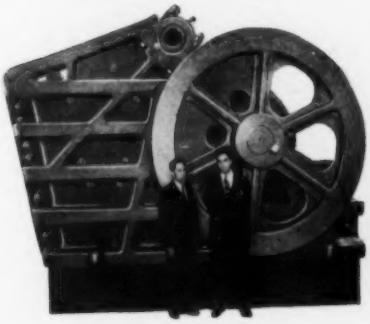
Send for illustrated bulletin describing KVS swing jaw crusher.

EXCLUSIVE FEATURES OF THE KVS SWING JAW CRUSHERS....

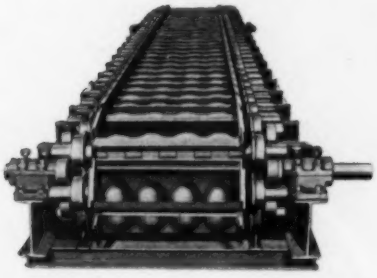
- Frames built of open hearth or Herculite steel with tensile strength of 60,000 lbs. per sq. inch.
- Counter-balanced fly wheel for lifting pitman at bottom of stroke. Hoisting engine or jacks not required to start machine.
- Frames made in two sections, bolted together at centers. Bolts thrown into tension whenever strain develops. This exclusive KVS feature is superior to construction methods where machines are joined at corners.
- Rigid strength of frames; toughness of jaw plates adds years of service to crusher; enables it to better withstand shock and stress of crushing tough rock and ore.

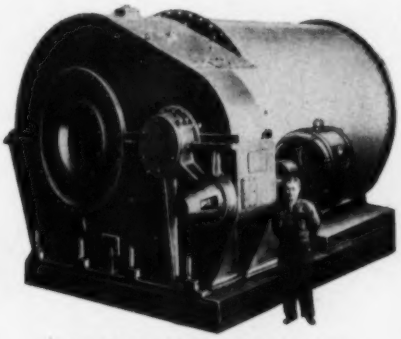
ASSURES CONTINUED LEADERSHIP

SWING JAW CRUSHER

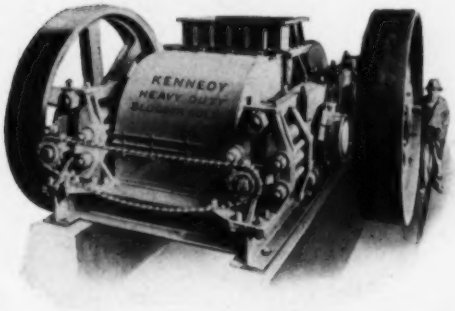


HEAVY-DUTY ROCK FEEDER





INTEGRAL GEAR DRIVEN MILL



HEAVY-DUTY
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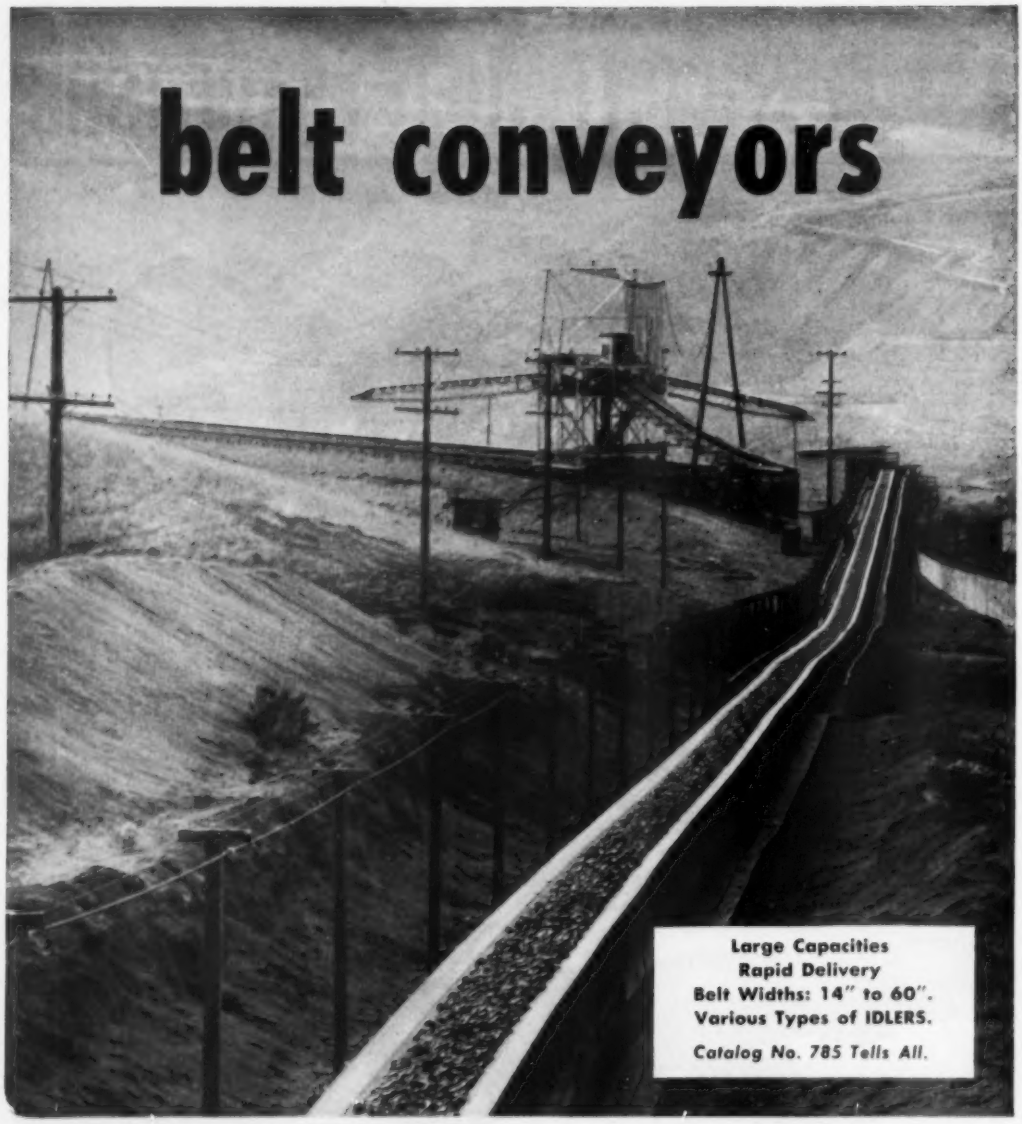
belt conveyors



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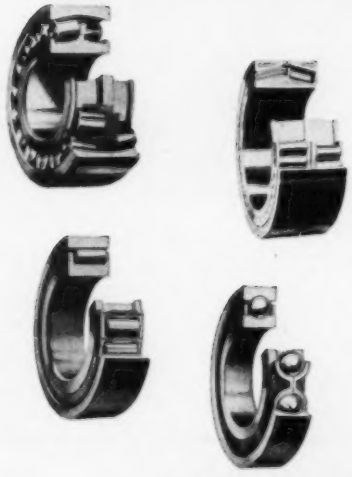
it takes experience...



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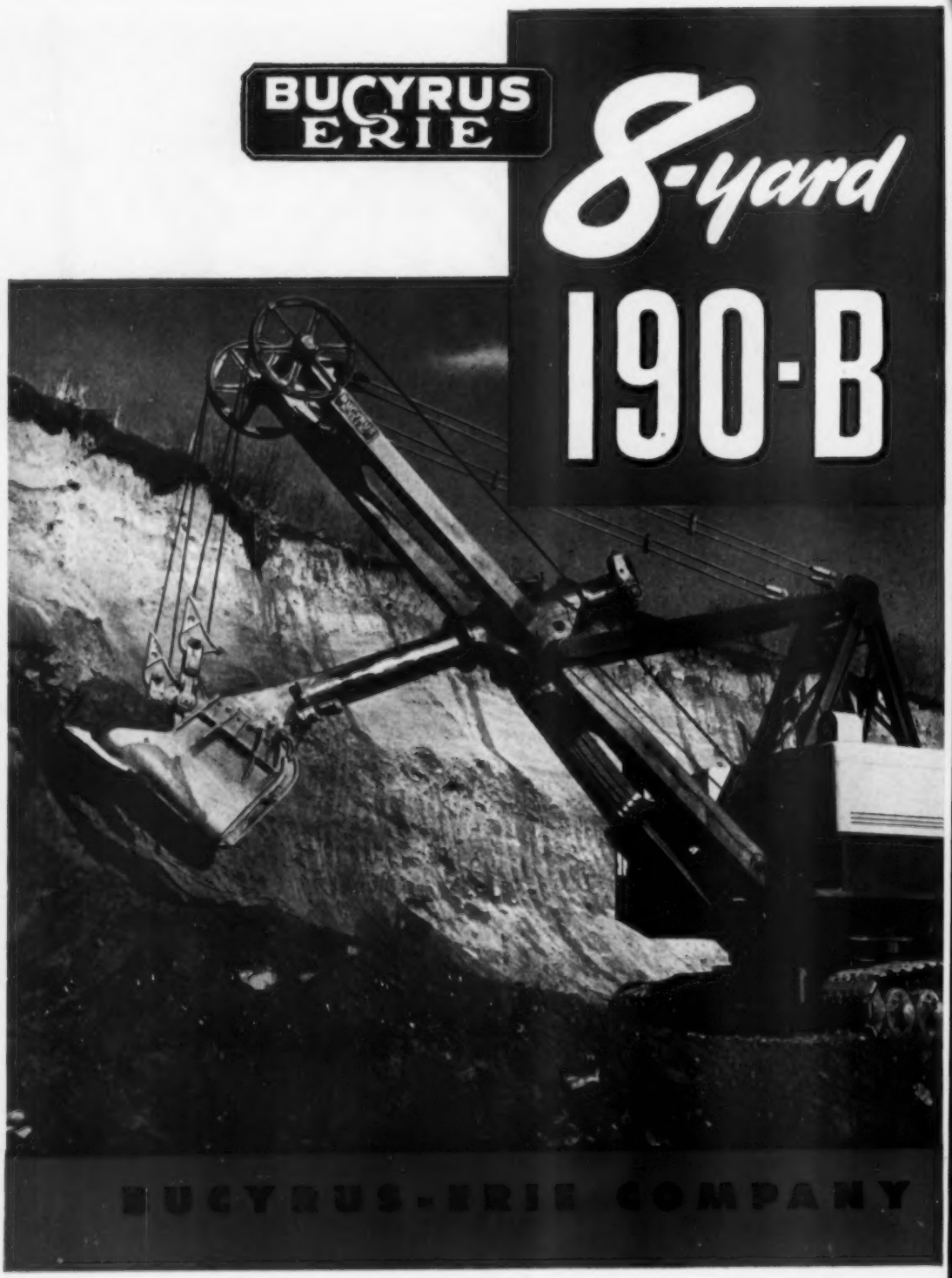
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8-yard
190-B
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for mines and quarries

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POWERFUL, MAIN MACHINERY

designed for double twin hoist, delivers power surely, smoothly, efficiently.

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provides ample strength for heavy duty and protective features for minimizing wear.

The 190-B has full Ward Leonard improved [illegible] is readily convertible to dragline service, and has numerous other outstanding features to meet the production demands of your toughest jobs.

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users specify AMSCO DREDGE PUMPS

More **Amsco** Pumps have been placed in dredges for sand and gravel recovery, river and harbor dredging, shell reclamation, and more recently, ores such as titanium, than those of any other manufacturer. The reasons for this preference are clear:

Amsco Pumps, with working parts made of manganese steel, can withstand the terrific abrasion of sand and the sledge hammer blows of rock much longer than any others.

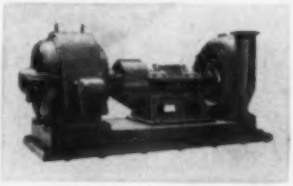
Amsco Pumps are designed from experience and engineered for your job.

▶These six basic types of Amsco Dredge Pumps—actually there are 40 different models—give a general idea of the complete line. The basic differences are in rated capacity, weight and construction of bearings, and in proportionate shaft sizes. Such modifications are made for economy...There is no dollar-wasting excess weight on the Amsco Pump engineered for your job. Water end parts are also available in ABK metal subject to our engineers approval.

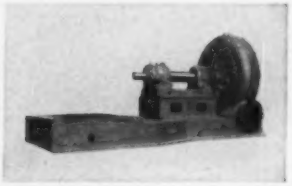
Amsco has a complete line of welding rods and electrodes to assure prolonged life and economical service of Amsco Dredge Pumps.

16-inch type XH—directly connected design; right hand bottom discharge. Can be fitted with "standard" or "counter-flow" water ends.

6-inch type SB-CF, form 24—antifriction bearing; stub base or belt driven; right hand bottom discharge.

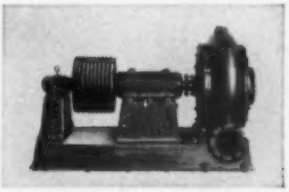


10-inch type M—left hand top discharge. Built in 6-, 8- and 10-inch sizes. Can be fitted with "standard" or "counter-flow" water ends.



30-inch type XHRB-CF—left hand bottom discharge; antifriction thrust and radial bearings.

12-inch type H-CF, form 40—right hand, top vertical discharge; belt driven. Combination two directional-type ball thrust bearing and sleeve-type radial bearings



8-inch type C, form 30—belt driven; left hand bottom discharge; combination ball thrust and ring oiling sleeve main bearings. Available with "standard" or "counter-flow" water ends.

Brake Shoe **AMERICAN MANGANESE STEEL DIVISION**
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Your Eimco can dig ditches, clean up slides, dig up shoulders, speed up new construction, in tunnels, loading trucks or in quarries loading rock.

The Eimco will load rock at the rate of 4 to 6 tons per minute average and sand or gravel at 6 to 8 yards per minute average.

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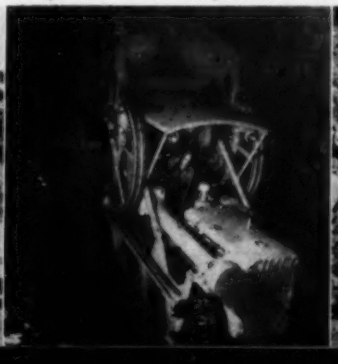
You Can't Beat an Eimco

Above: Digging ditch beside highway in Canada. Below, left to right: Clearing rock off highways, taking out shoulder for highway widening, loading in a tunnel, loading trucks in rock quarry.



Proved Performance

on the toughest jobs

On a wide range of jobs and under the toughest conditions, "Eucs" move more loads or tons per hour at the lowest cost. Large capacity, long life in heavy duty service, and speed on the haul and dump—these are features that assure low cost hauling and dependable performance.

Bottom-Dump Euclids have proved their rugged staying power and ability to do the toughest jobs in off-the-highway construction and industrial work. Powered by diesel engines of 190 to 300 h.p., they range in capacity from 13 to 25 cu. yds., and have top speeds loaded up to 34.4 m.p.h.

Rear-Dump "Eucs" are designed and built to move rock, coal, ore, overburden and other heavy excavation. They range in capacity from 10 to 34 tons, have top speeds up to 36.3 m.p.h. with full payload, and diesel engines of 125 to 400 h.p.

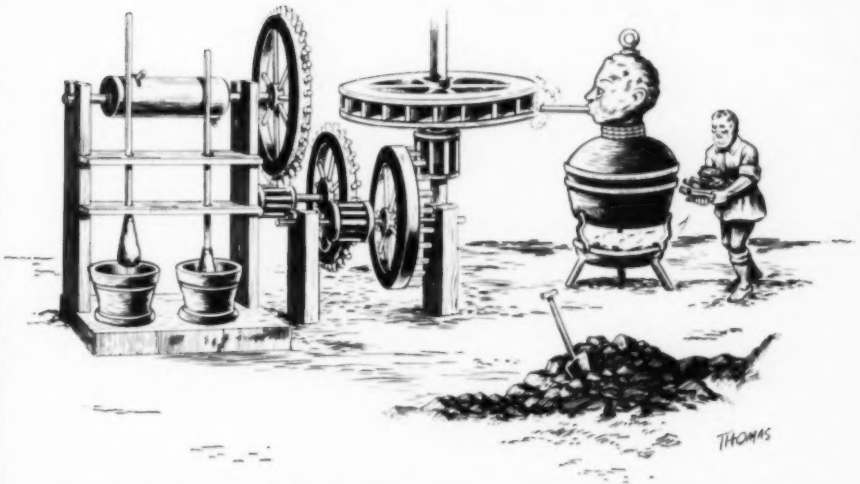
For help with your off-the-highway hauling problems, call your Euclid Distributor today or write for information on the complete line of Euclid equipment for moving earth, rock, coal and ore.

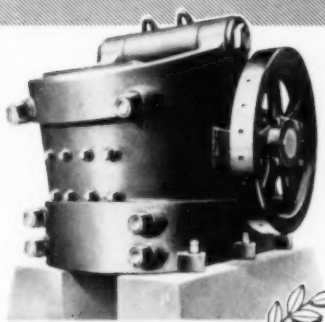
"EUCS" are job proved for more loads per hour and more profit per load.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

This is the first steam turbine . . .

designed for crushing purposes by the engineer Branca in 1629. Crude as it was, it opened new doors to more efficient production.





The Traylor Type R Jaw Crusher, with its scientifically reinforced Meehanite frame and special features, contributes to plant efficiency and lowers the cost of production. Bulletin 1123 gives description.

History shows that by coupling inventiveness with hard work, man has constantly improved the tools he needs to do a better job. For 50 years, Traylor has carried on this tradition by developing new and better rock crushing equipment. In that time, Traylor machinery has gained a world wide reputation for efficiency and dependability on the job. It takes experience to meet the demands of progressive rock crushing methods today. Traylor has experience . . . half a century of it.

OUR GOLDEN ANNIVERSARY YEAR

1902 1952

TRAYLOR ENGINEERING & MANUFACTURING CO.

1476 MILL ST., ALLENTOWN, PA.

SALES OFFICES: New York • Chicago • San Francisco

Canadian Mfrs.: Canadian Vickers, Ltd., Montreal, P. Q.

a **Traylor** *leads to greater profits*

ACCURATE, ECONOMICAL BENEFICIATION of many low-value NON-METALLIC AND METALLIC OXIDE MINERALS now practical with CYANAMID 800 SERIES FLOTATION REAGENTS and PROCESSES

Originally developed to beneficiate iron ore on the Mesabi, Cyanamid 800 Series Reagents now have many diverse applications in the selective flotation of iron-bearing and other oxide minerals. Improved processes for their more effective use have steadily expanded the sphere of these economical reagents . . . both in treating — 65 mesh material directly and in making an end-product from feed that has been pre-concentrated by mechanical methods. Typical examples of what can be done are shown on the page opposite.

Cyanamid also offers the two most efficient Separation Processes by Gravity Differences (Heavy-Media Separation and the Dutch State Mines Cyclone Separator) both of which merit investigation for non-metallic mineral concentration.

More efficiently than older gravity methods, Heavy-Media Separation accurately separates valuable mineral from unwanted material in sizes down to 10 mesh when there is a difference in the specific gravities of each fraction of the feed. The Dutch States Mines Cyclone Separator is particularly applicable to low cost separation of 3/8" x 65 mesh and finer sizes. These processes, already in large-scale use in a number of plants, are successfully separating valuable non-metallic minerals from gangue, although the difference in their specific gravities may be as low as 0.05. Either can be used as a pre-concentration step or for the production of marketable products.

TYPICAL EXAMPLES OF THE EFFECTIVENESS OF CYANAMID 800 SERIES FLOTATION REAGENTS

GLASS SANDS. In the East, Middle West and on the Pacific Coast, four flotation plants with a combined feed-rate upwards of 150 tons per hour are profitably beneficiating sands containing up to 3% of such deleterious impurities as iron oxide, ilmenite, muscovite and biotite mica.

From a feed containing from 0.076% to 0.172% Fe_2O_3, a typical plant produces a finished product assaying 0.018% to 0.027% Fe_2O_3, with negligible amount of other impurities. Reagents used per ton of feed are: Cyanamid Reagent #825, 0.42 lb.; Cyanamid Reagent #801, 0.83 lb.; Light Fuel Oil, 0.4 lb.; Pine Oil, 0.2 lb., Sulphuric Acid, 0.2 lb.

FELDSPAR. Removal of biotite, tourmaline, garnet and iron oxides from feldspar ore to produce a high-grade glass spar or ceramic spar is no longer a difficult problem. Cyanamid Reagent #801 removes iron-bearing minerals; a cationic collector floats the feldspar. Typical operating results are:

PRODUCT	% WEIGHT	Analysis % Fe_2O_3	% Al_2O_3	Distribution % Fe_2O_3
Original Feed	100.00	0.506		100.0
Slimes (discard)	6.10	0.75		9.09
Flotation Feed	93.90	0.49		90.91
Concentrate #1 (Iron)	12.21	3.36		81.23
Concentrate #2 (Feldspar)	59.36	0.07	18-19%	8.30
Quartz Tailing	22.33	0.031		1.38

GARNET. Almandite, the iron-aluminum garnet, is separated from calcium-iron-magnesium silicates by a process involving the controlled feed of Cyanamid Reagent 825 with controlled acidity of the circuit to selectivity float one iron-bearing mineral from the other. Treating the tailing from Heavy-Media Separation and jigs, one flotation plant recovers 85% of the garnet in a feed averaging 12% garnet. Using only 0.4 lb./ton of Cyanamid Reagent 825, this plant produces an end-product analyzing over 98% garnet and suitable for special purposes.

BARITE. Ore containing 15-18% barium sulphate contaminated with hematite, quartz and clay can be beneficiated by de-sliming and floating in an alkaline circuit containing 2 lb./ton Cyanamid Reagent #825 and 2 lb./ton Sodium Silicate. End product averages 95% barium sulphate – a grade satisfactory for premium-priced drilling mud.

KYANITE. Cyanamid 800 Series Reagents have proved practical in concentrating a feed containing 30% $Al_2O_3SiO_2$ and 1½% Fe_2O_3. End-product averages 58% alumina with grade suitable for ceramic use. All evidence indicates that flotation of many lower-grade kyanite ores is perfectly practical.

RHODOCROSITE. A well-known copper property contains zones in which the ore is high in manganese and sulphide minerals. This ore is treated to recover the sulphides and the tailing is conditioned with 0.90 lb./ton Cyanamid Reagent #825 plus 0.80 lb./ton cotton-seed oil foots in an alkaline circuit to produce a 35% manganese concentrate from 14% feed. Previous practise used acidulated cotton-seed oil foots. The change to Cyanamid Reagent #825 in a alkaline circuit gave greater selectivity and lower reagent cost.

It will pay you to get in touch with Cyanamid if you mine or contemplate mining any of these minerals:

ANDALUSITE BARITE BAUXITE CEMENT ROCK COAL CHROMITE DIAMONDIFEROUS GROUND DOLOMITE FELDSPAR FLUORSPAR GARNET GLASS SANDS GRAPHITE GRAVEL GYPSUM ILMENITE IRON OXIDES KYANITE MAGNESITE MANGANESE MICA OLIVINE PEARLITE PHOSPHATE ROCK POTASH RHODOCHROSITE SALT SILLIMANITE SCHEELITE SPODUMENE VERMICULITE WOLFRAMITE AND SIMILAR MINERALS

Quickly, at low capital cost, you may be able to increase output, cut costs by less selective mining, work currently sub-marginal deposits or ship higher grade end-products. We offer you the benefit of our extensive experience in concentrating non-metallic and metallic oxide minerals. Preliminary discussion entails no cost or obligation. Why not write us, outlining your problem?

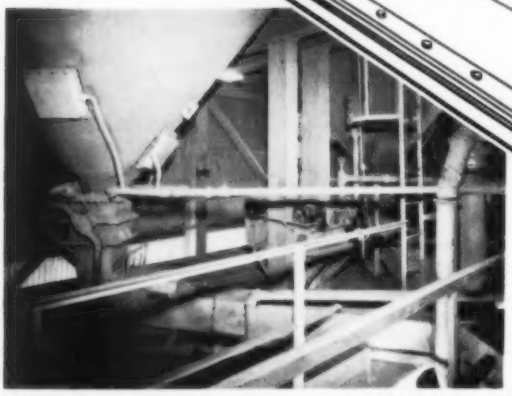
AMERICAN *Cyanamid* COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK

Pulverized materials flow like water!

View of one of three Airslides conveying from three bins to a main cross Airslide.



Partial view of four Airslides conveying from four bins; shows F-H Airfeeder and Airslide underneath bin, left. Fuller Aeration Units in cone of bin, for aeration and prevention of arching. Blowers, furnishing air for Airslides and aeration units, in background, center.

F-H AIRSLIDE®
CONVEYOR

For sheer simplicity, low-maintenance costs and ease of operation, the F-H Airslide Conveyor is just about tops. In this system, dry, fine materials like gypsum, soda ash, fly ash, cement, barytes, flour, alumina, silica, talc, resins, detergents and soap powders are aerated and made to flow like water. Low-pressure air is dispersed through the material from a porous medium so that each particle is enveloped in air, thus reducing the interparticle friction and the angle of repose. Hence the material flows.

Think what this means to you? Because the system is completely enclosed, danger of contamination is removed . . . dusting eliminated. No moving parts, consequently repairs and costly down-time is at the minimum. Easily erected, a space-saver, the Airslide permits economy and convenience in location without the restrictions or straight-line limitations of mechanical conveyors.

Why not have a Fuller engineer show you how the Airslide can help cut your conveying costs . . . modernize your present plant equipment, or plan an entirely new system. Chances are he can show you how a minimum expenditure can bring you a conveying system that means low cost, reliable operation.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS · COMPRESSORS AND VACUUM PUMPS · FEEDERS AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
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Fuller Company is the exclusive manufacturer of air gravity conveyors, except for use in motor vehicles, under Huron Portland Cement Company U. S. Patent Nos. 2,316,814, 2,517,837, 2,527,394, 2,527,455, 2,527,466, 2,527,488 and Patents Pending.

FH-28

Gulf Quality Lubricants

keep equipment operating smoothly at Ohio Gravel Company

Close to No. 1 requirement for a smooth-running operation is smooth-running equipment. That's why so many leading operators, like Ohio Gravel Company, for example, use the lubricants identified by the familiar Orange Disc.

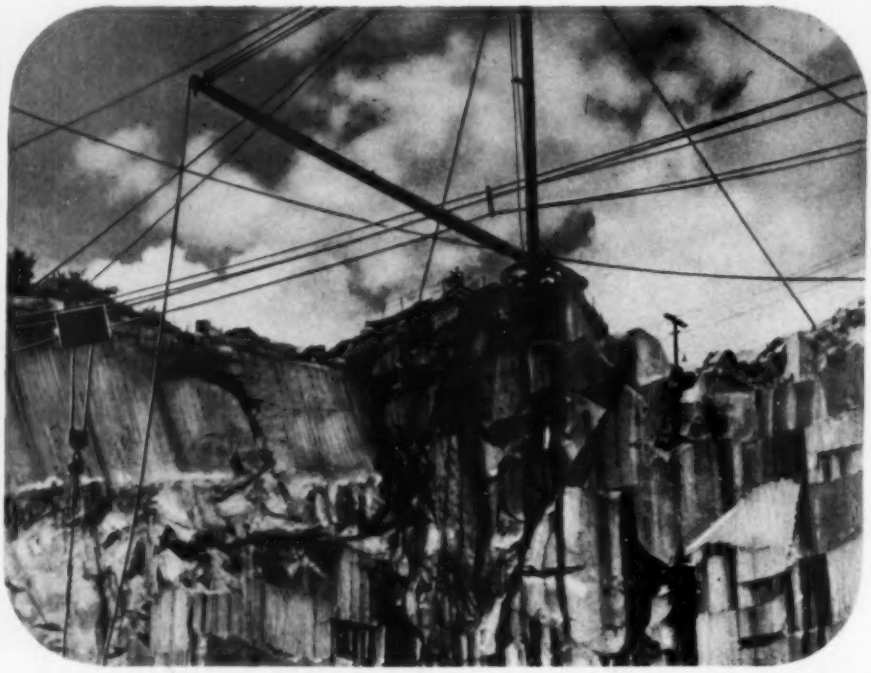
They have found that Gulf's oils and greases provide better protection for every gear and bearing, and help insure dependable equipment performance, lower maintenance costs.

Let us discuss with you how Gulf products and fine service can help your operation. They are available to you through more than 1400 warehouses in 31 states from Maine to New Mexico.

GULF OIL CORPORATION • GULF REFINING COMPANY
PITTSBURGH 30, PENNSYLVANIA

GULF SERVES INDUSTRY

WIRE ROPE



This is the most efficient rope we've ever made for quarry service

JUST MENTION wire rope and most everyone thinks of Roebling. For one thing, Roebling made the first wire rope in America. But what counts more, we've always set the pace in developing better wire and better rope for the needs of every branch of industry.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is the quarry men's best bet for all-around efficiency and long life. It helps you get continuous production and stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREEDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Firm grip *on loose material*

Nothing discourages temperamental equipment faster than loose material. That's why so many owners demand a "Caterpillar" D8 Tractor with a No. 8U Bulldozer. They know that the 8U 'Dozer can take a large load, hold it on the blade, and put it where it is needed. The No. 8U Bulldozer is a giant with the deft touch of a surgeon.

Eight hours daily in Butler Ville, Utah, this unit works steadily in soft, loose material, feeding 175 tons an hour to a gravel plant with a minimum of spillage. It's owned by the Utah Sand & Gravel Products Corp. The plant produces concrete and plaster sand, concrete aggregate, chips, road base, and mulch material.

Reports Superintendent Rex S. Band:

"We always have been partial to 'Caterpillar' machines. They operate very satisfactorily in extreme dust conditions. Our dealer service is A-1. Wherever we go, we find 'Caterpillar' service the best there is."

This battling big yellow unit was built to be the master of any job you give it. Both 'dozer and tractor were engineered for long life in all extremes of weather and dust. You can keep them that way by insisting on genuine "Caterpillar" parts.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

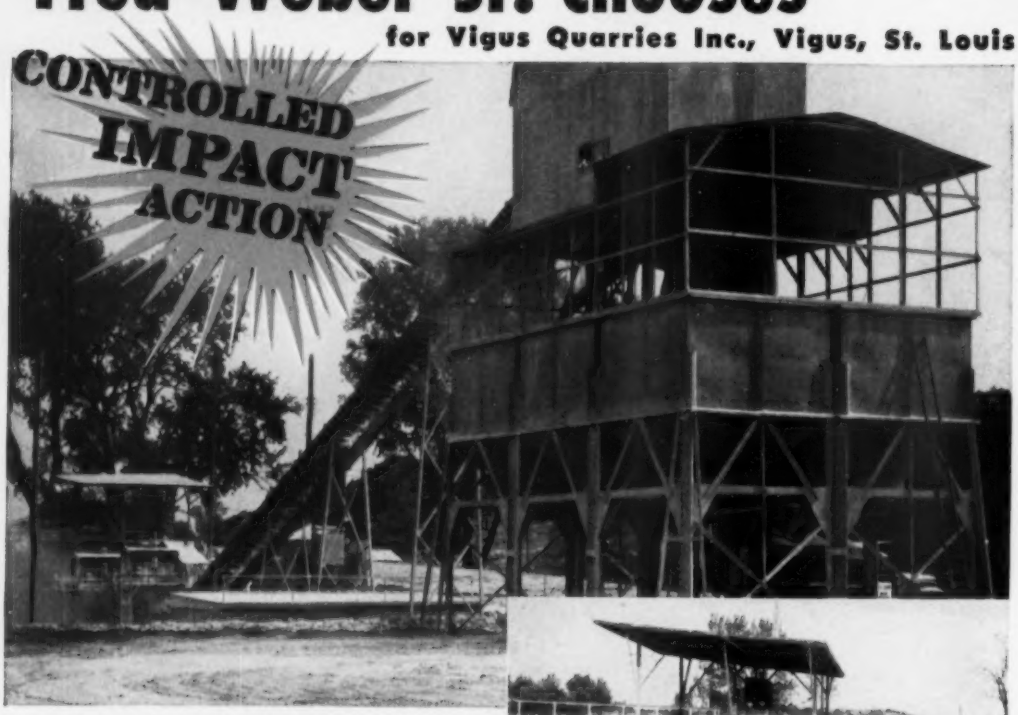
CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Fred Weber Jr. chooses

for Vigus Quarries Inc., Vigus, St. Louis



3240 PMCO Impact Master with 36" x 12' apron feeder, 30" discharge conveyor, Murphy diesel power. Output fed to vibrating screen over 30" plant conveyor.

TOP QUALITY AGGREGATE IN ONE PASS THROUGH PMCO IMPACT MASTER

Fred Weber Jr. has proof of PMCO Impact Master performance. He's producing 135,000 tons of top quality concrete aggregates to meet CAA and City of St. Louis specifications for airport runways.

Feeding with three trucks, Vigus Quarries Inc. are averaging 175 tph of crushed aggregates. That's 150 tph of specification material with 40% of 2½" down to 1¼", and 60% of 1¼" down to ¼"; and 25 tph of base rock and aglime. Mr. Weber is enthusiastic about the performance. He says, "We've fed the Impact Master peak loads with additional trucks and we know it has the capacity to turn out 250-260 tph."

Top capacity with greater control over finished product size . . . that's what Controlled Impact Action gives you in the PMCO Impact Master. Its high ratio of reduction eliminates secondary crushers and auxiliary equipment and lets you step into big volume production with minimum plant investment. PMCO Impact Masters have capacities up to 500 tph. Write today for profit-making details on the size that meets your requirements.

Manufactured, sold and serviced by Impact Master, Division, Universal Engineering Corp., 625 C Avenue N. W., Cedar Rapids, Iowa.

UNIVERSAL ENGINEERING CORPORATION Division of PETTIBONE MULLIKEN CORPORATION

625 C Avenue N.W., Cedar Rapids, Iowa
Phone 7105

4700 West Division St., Chicago 51, Illinois
Phone Spaulding 2-9300

"Our Whites pay off 3 ways"

Reports Ralph H. Anderson,
President, W. E. Anderson Sons Co.,
Columbus, Ohio

R. H. ANDERSON's progressive company has a fleet of 50 Whites that hauls 3 tons per minute, travels more than 2½ million miles a year from their ready-mixed plants and 8 batcher plants in Central Ohio.

RUGGED WHITE DUMP TRUCKS . . . busy White concrete mixers . . . stockpiling White tandem dump trailers . . . all give W. E. Anderson Company, Columbus, Ohio, the real lowdown on White performance and economy. And 25 years with Whites in their fleet confirm their report.

"Whites pay off in these three ways:" President R. H. Anderson says.

✔ **"LONGER LIFE**—we roll up the miles in our fleet and Whites consistently keep our maintenance costs low.

✔ **"MORE PAYLOAD**—we're going to larger payloads constantly and Whites have the design and the power to do it efficiently.

✔ **"DRIVERS PREFER WHITES**—take pride in their trucks and take better care of them because they know Whites stand up on tight schedules, heavy loads and hard trips. They help our safety program."

Find out how Whites can help your business. See your White Representative for facts.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

MUSTANGS PAY OFF!

White Mustang Engines went into action for W. E. Anderson Co. on 24-hour stockpiling operation handling 22,000 lb. loads. Wonderful power reserve, low maintenance cost, and an extra mile-per-gallon of gasoline.

White

For more than 50 years the greatest name in trucks

BLASTING CLUES from the ATLAS MACHINE-GUN CAMERA

MILLI-SECOND DELAYS ...Progressive or Alternate?

Here for the first time is photographic evidence comparing these two methods of timing detonation

PROGRESSIVE BLAST: Eight holes are loaded in this Millington, N. J. operation of the North Jersey Quarry Company. ROCKMASTER® milli-second delays Nos. 0 to 7 are arranged progressively from right to left. The delay interval between each is approximately 25 milli-seconds, making a total delay spread of 150 milli-seconds. Control is excellent, fragmentation good. Characteristically the rock pile slopes toward the area of most delay. Confinement of gases (and consequent elimination of air blast) is practically complete. This is an excellent example of progressive action at its best.

ALTERNATE BLAST: Seven holes on the same face at the same quarry. ROCKMASTER Nos. 2 and 3 are used alternately. Delay spread is approximately 25 milli-seconds. Because the ROCKMASTER delays of any particular period vary slightly in timing, it is unlikely that any two holes in this blast are detonated at exactly the same instant. The bellying toe and rippled crest show the one-two punch of the alternate pattern—mid-holes hitting while holes on either side have rock under stress. This is the most effective way to hit rock for maximum fragmentation. Latest seismograph readings reveal that the alternate pattern produces little or no increase in vibration as compared with progressive patterns.

ROCKMASTER blasting is *controlled* blasting. See how it can work for *you*. Send for the free 20-page book *"Quarry Blasting the* ROCKMASTER *Way."* It illustrates milli-second delay methods with machine-gun camera photos.

ATLAS EXPLOSIVES

ATLAS

"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities

Quarry operators:

*95% of your tonnage can now be handled with machines completely lubricated by just 3 Shell products **

***SHELL RETINAX A GREASE** . . . a superior new multi-purpose grease for all types of heavy-duty automotive vehicles. It does the job of four or more specialized greases—yet only one gun is required.

Recommended for chassis (*all points*), wheel bearings, universal joints, and water pumps. Shell Retinax A gives you better protection against wear and washing out.

***SHELL SPIRAX EP†** . . . an exceptional "alloy type," Extreme Pressure gear oil. Shell Spirax EP is recommended for rear axles of the hypoid, spiral bevel, and spur gear types, as well as for heavy-duty transmissions. It is extremely stable . . . has long-lasting anti-rust and film strength properties. Results: longer gear life, lower maintenance costs.

***SHELL ROTELLA OIL** . . . for all engine lubrication, Shell Rotella Oil is a new, fortified, extra heavy-duty lubricant which has set new standards of performance in high-speed diesel and heavy-duty gasoline engines.

By maintaining clean engines and minimizing sludge formation, piston lacquering, ring and valve sticking, and port clogging, Shell Rotella Oil extends periods between overhauls, reduces parts replacement costs, and gives you reduced oil consumption.

†Some manufacturers recommend a straight mineral oil for gear lubrication. Your Shell Lubrication Engineer will suggest the proper lubricant in such cases.

SHELL "3-BARREL" LUBRICATION

SHELL OIL COMPANY
50 West 50th St., New York 20, N.Y.
100 Bush St., San Francisco 6, Cal.

Please send me literature describing the 3-Barrel plan of lubrication.

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Akron—A-C Supply Co.
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Oklahoma City—Southwest Elec. Co.
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Pittsburgh—Penn. Elec. Coil Corp.
York—Industrial Electric Company

SOUTH CAROLINA
Greenville—Southern Elec. Serv. Co.
Spartanburg—Southern Elec. Serv. Co.

SOUTH DAKOTA
Sioux Falls—Electric Motor Repair

TENNESSEE
Columbia—Middle Tenn. Arm. Wks.
LaFollette—Standard Arm. Works
Memphis—Indus. Elec. & Supply Co.

TEXAS
Amarillo—G. E. Jones Elec. Co.
Beaumont—Elec. Mach. & Repair
Dallas—Industrial Elec. Equipment Co.
El Paso—B & M Machinery Co.
Fort Worth—Central Electric Co.
Houston—Roy A. Berentz Co.
Sweetwater—Sweetwater Electric Co.

UTAH
Salt Lake City—Diamond Electric

VIRGINIA
Richmond—Wingfield & Hundley
Roanoke—Virginia Armature Co.

WASHINGTON
Spokane—Lee F. Austin Company

WEST VIRGINIA
Charleston—Charleston Elec. Supply
Fairmont—Central Elec. Repair Co.

WISCONSIN
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Milwaukee—Dietz Electric Co.
Wausau—Electric Motor Service
Wisconsin Rapids—Staub's Elec. Wks.

ALLIS-CHALMERS CERTIFIED SERVICE SHOPS are independent service shops which have met rigid standards for ability, experience, equipment and business integrity. They use factory approved methods and parts and do your work promptly at a fair price.

Of course, Allis-Chalmers Certified Service Shops give good service on any electrical equipment, of any make. Tear out this ad and save it, or write the name of the A-C Certified Service Shop nearest you in your address book. Allis-Chalmers, Milwaukee 1, Wisconsin. A-3864

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Sold . . .
Applied . . .
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by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

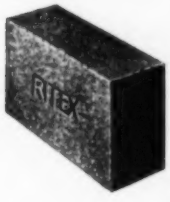
Seasons Greetings
made with brick!

● Those bells that ring out Yule . . . the electric train under the tree . . . the piles and piles of packages—most everything we enjoy at Christmas owes its origin, in part, to *refractory* brick.

● Without refractory brick to line the furnaces of industry there would be no heat, light or power, no paper, no metal, no manufacturing, no transportation.

● Next to agriculture, there is no more vital contribution to the economy of our nation than such heat-resisting refractories products as those made by Grefco. From Grefco mines and plants—here and overseas—General Refractories Company is supplying brick, mortars, plastics and castables to serve our nation in times of peace and in times of problem.

● At this time of year let us hope it will be peace. But whatever problem we must face, let's make sure American men and American industry are ready to measure up!



General Refractories Company

PHILADELPHIA

Tournapulls strip, mix clay for Texas

Self-loading overburden each "C" strips 96 yds. hourly over 3500' cycle

ELOIN-BUTLER BRICK CO., Austin, Texas, uses 3 Tournapulls at their Elgin plant to strip overburden and mine all their brick and tile clay. Rigs haul clay from pit and dump into crusher bin at plant. When plant has an adequate supply of clay, Tournapulls switch to other side of pit to remove overburden.

Pusher-loaded in pit clay each "C" mines 120 yds. hourly over 2100' cycle

C Tournapulls now have capacity of 16 yards heaped, 2½ yards more than units shown here

PUSH-LOADED by 93 h.p. crawler-tractor at the clay pit, electric-control Tournapulls heap 10 to 12 bank yards of hard, dry material. By digging a light cut on a sloping face, they get an excellent mixture of material for uniform brick and tile production. Load distance is approximately 150 ft. . . . load time, 80 seconds.

TOURNADOZERS® 186 h.p., 4-wheel drive, speeds to 19 m.p.h.

TOURNAPULLS® 7, 16, 27, 45-yd. capacities; speeds, 28 to 40 m.p.h.

TOURNAROCKERS® 9, 18, 25, 50-ton rear-dump haulers

TOURNAHOPPERS® 18 and 27-yd. bottom-dump haulers

mine and brick plant

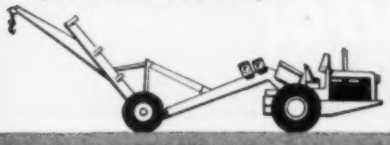
SELF-LOADING SANDY LOAM OVERBURDEN down 18% grade, Tournapulls pick up 8½ to 9 bank yards in 45 to 50 seconds. Says Superintendent Eugene Ward: "Tournapulls serve a dual purpose by removing overburden and mining clay. The self-loading feature is excellent as it allows maximum production."

RIGS CLIMB UP 18% GRADE to top of overburden cut. Complete 3500' cycle from pit to dump and return takes 4½ min., for 12 trips per 50-min. hour. Production per unit varies from 96 to 108 bank yards per 50-minute hour when rigs self-load in overburden, to 120 to 144 bank yards when they are push-loaded with brick clay.

HIGHBALLING 2/10-MILE to hopper from clay pit, electric-control "C's" average 9 m.p.h. On return, they climb 5 to 18% grades to top of clay bank. Elgin-Butler Brick bought their first Tournapull in 1946. It has performed so well that when the company expanded operations they purchased two 18-ton C Tournapulls.

TOURNAPULL DUMPS BRICK CLAY into hopper. Dump time, plus time needed to move on and off ramps leading to trestle, averages 30 seconds. Complete 2100' cycle from pit to hopper and return takes 4½ minutes. Since photos were taken, use of train has been discontinued. Now, Tournapulls haul from pit directly to plant.

Tournapull — Trademark Reg.U.S.Pat.Off. P-210-BC



TOURNACRANES*
10, 20, 30 and 40-ton
lift capacities

*Trademark Reg.U.S.Pat.Off.

LeTOURNEAU
LET
EQUIPMENT

R. G. LeTOURNEAU, INC.

Peoria, Illinois

THE BARBER-GREENE *Redi-Fab* SERIES MEETS THE NEED OF 2 OUT OF 3 PERMANENT CONVEYOR INSTALLATIONS

Truss or Channel Frame Construction

WHAT PACKAGED CONSTRUCTION MEANS TO YOU!

A study, based on more than 35 years' experience in the design and installation of belt conveyors, showed:

2 out of 3 conveyors fall within the range of B-G Redi-Fab "Packaged" Permanent Conveyors.

With the Redi-Fab Series:

(1) You get a quotation quickly.
(2) You get fastest delivery because Redi-Fab components are manufactured in advance—they are normally sold to you "off-the-shelf" by your B-G distributor or from factory stocks.
(3) You completely eliminate special engineering costs.
(4) You greatly reduce the time and cost of erection.
(5) Your Redi-Fab Conveyor can be lengthened, shortened or otherwise altered to meet new conditions.

WIDE CHOICE OF COMPONENTS AND ACCESSORIES

Redi-Fab components and accessories include drives, feeders, belts and belt covers, carriers, backstops, A-frame, truss sections, channel frames, walkways, hoppers, etc.

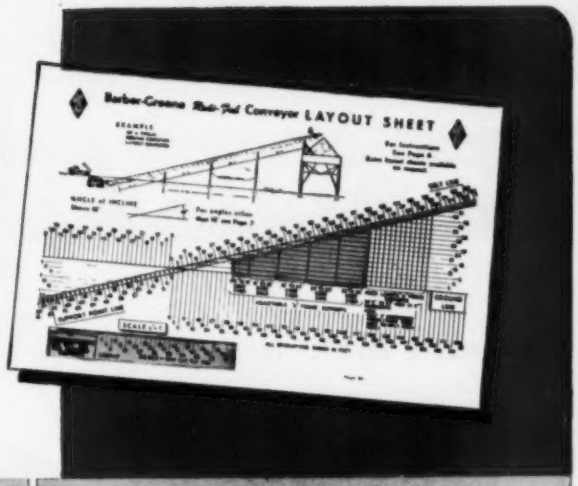
WRITE FOR *Redi-Fab* CATALOG

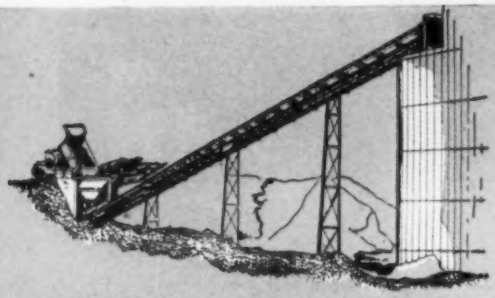
A copy of the Barber-Greene Redi-Fab Catalog will be sent promptly on request.

see your **B-G distributor** *...or write*

YOU CAN SELECT YOUR OWN CONVEYOR

While a Barber-Greene representative will gladly assist you in selecting your Redi-Fab Conveyor, you can actually do it yourself. Right out of the catalog. No knowledge of engineering is required. All you need to know is the material to be handled, the capacity you require and the elevation. All other information, including an easy-to-use layout sheet, is right in the catalog.

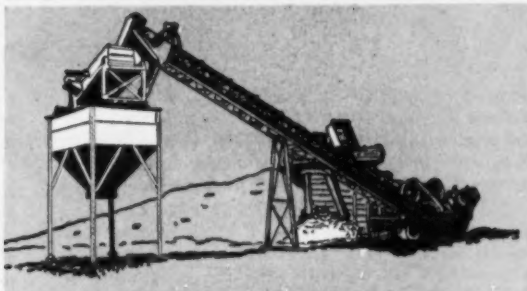




Typical Redi-Fab Conveyor elevating truck-delivered material to a washing and screening plant. Feeders are available, driven from conveyor foot shaft.

Stock-piling from truck. Redi-Fab drive options permit locating power unit near foot end to allow maximum overhang at head end.

Working with B-G car unloader, Redi-Fab Conveyor charges bins with coal and coke. Application is common for handling aggregates, bulk chemicals, etc.



Crusher discharge is elevated to vibrating screen for delivery to bins. Redi-Fab drives available to operate screen and conveyor from same power unit.

280

Barber-Greene BG

Aurora, Illinois, U. S. A.

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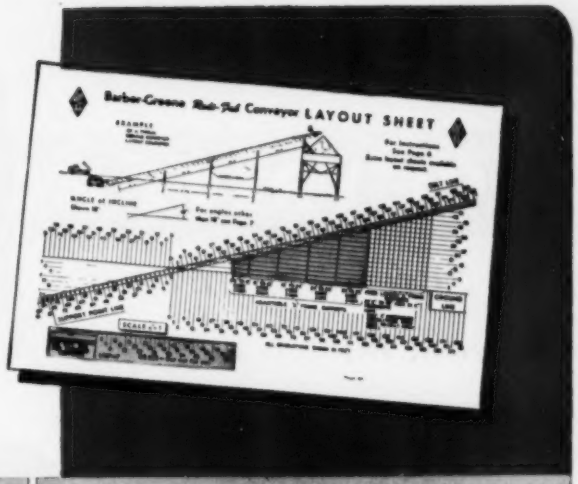

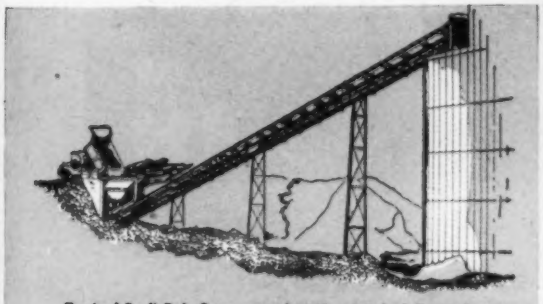

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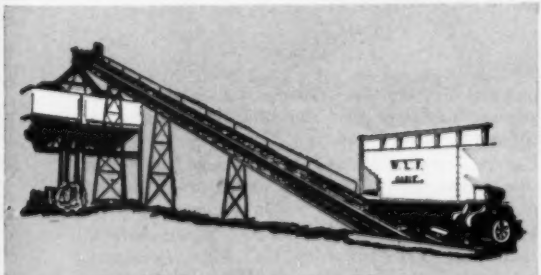

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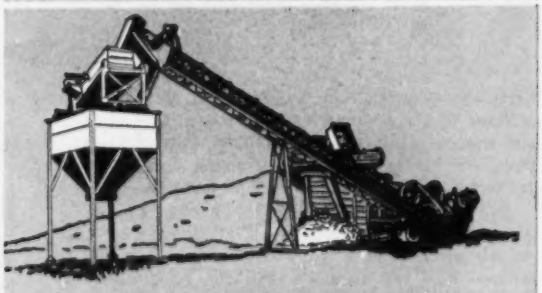


Crusher discharge is elevated to vibrating screen for delivery to bins. Redi-Fab drives available to operate screen and conveyor from same power unit.

280

Barber-Greene

Aurora, Illinois, U. S. A.

"Every American should have a nest egg"

FREDERICK C. CRAWFORD
President, Thompson Products, Inc.

"That nest egg can be in the form of U. S. Defense Bonds—a patriotic equivalent of cash. Defense-bond dollars grow. Americans who enroll in the Payroll Savings Plan become shareholders in Uncle Sam, Inc. With their chips in the game they are helping the country to deal with problems of finance and inflation. As investors in the nation they are more apt to vote for wise government policies to safeguard their investment."

Certainly every American should have a nest egg—and millions of them will: over 7,000,000 employed men and women, enrolled members of the Payroll Savings Plan, are putting aside approximately $150,000,000 per month in the improved U. S. Defense Bonds.

And there is no safer, better way to make dollars grow: the cash value of Series E Bonds held by individuals on December 31, 1951, amounted to $34.8 billion—$4.8 billion more than the cash value of Series E Bonds outstanding in August, 1945.

Employers, too, benefit from the Payroll Savings Plan: the Payroll Saver is a serious worker. He thinks twice before he takes a day off—he's mindful of the effect on his take-home savings. He's a more careful worker—he wants to keep off the accident list. Records show that as employee participation increases, absenteeism and "Lost Time Accidents" decrease and the production curve goes up.

Call for a report on your Payroll Savings Plan. What is the percentage of employee participation? Is the plan being brought to the attention of new employees?

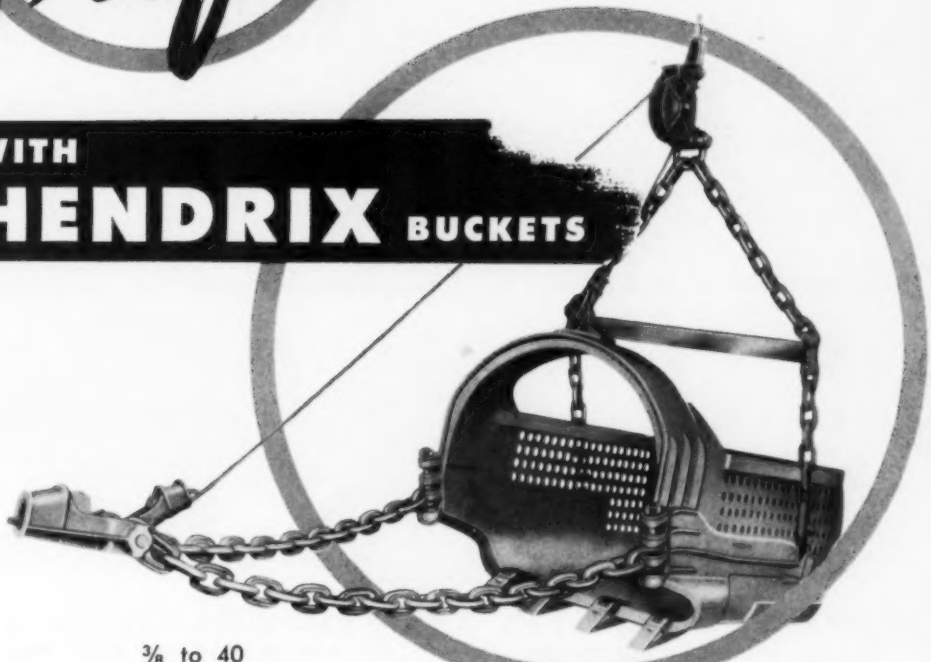
If your percentage is less than 50%, phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will explain how easy it is to conduct a person-to-person canvass that will put a Payroll Savings Blank in the hands of every one of your employees. That's all you have to do. Your employees will do the rest—they *want* to join the plan that provides for their security.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

PIT AND QUARRY

More Profits ON EVERY JOB

WITH **HENDRIX** BUCKETS



3/8 to 40
CUBIC YARDS

A TYPE & SIZE
FOR EVERY
DIGGING PURPOSE

More and more dirt-moving men notice the number of Hendrix Dragline Buckets being used on other jobs. They ask questions and learn that Hendrix Buckets move more dirt . . . easily . . . quickly . . . and without breakdowns . . . RESULTING IN MORE PROFITS. That is why more and more bucket users try Hendrix Buckets . . . then turn around and specify that ALL their draglines be equipped with money-making Hendrix Dragline Buckets!

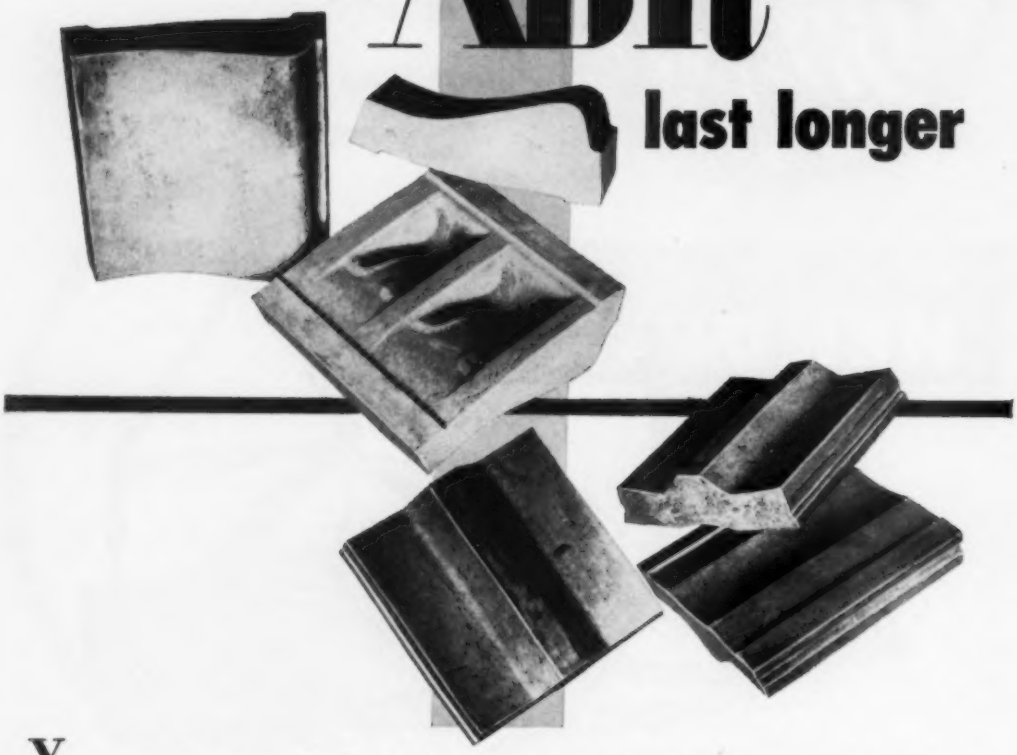
Hendrix Buckets May Be Special Ordered Without Perforations

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

HENDRIX MANUFACTURING CO., INC.

MANSFIELD — LOUISIANA

cement mill liners in ABK METAL last longer



You can cut replacement cost of liners in primary, secondary or tertiary compartments—for wet or dry grinding of raw stone or finished product—with ABK Metal abrasion resistant liners.

Here are typical reports from operators who have experienced real savings. "ABK Metal outlasted chilled white iron 2.9 to 1". . ."ground an additional 1.5 million barrels before replacement" . . . "ABK liners tripled our interval between relinings" . . . "less downtime for replacements and lower labor maintenance costs".

Moreover, ABK liners maintain desired contours, providing maximum agitation and grinding motion in the mill.

Let us show *you* how ABK Metal—a nickel-chrome alloy of controlled structure with an extreme hardness (500-700 Brinell, as required)—can lower costs and improve performance in your mills.

for better protection against abrasion specify ABK METAL

American Brake Shoe Company

BRAKE SHOE AND CASTINGS DIVISION

230 Park Avenue, New York 17, N. Y.

WIRE ROPE, too, resists attack with the RIGHT KIND of muscle

Brawny chest and shoulder muscles make the gorilla a formidable foe in the eternal warfare of the jungle. Defending himself and his family, this 450-pound heavyweight stands erect and fights back with sledge-hammer blows of his mighty forearms.

In wire rope, too, it takes the right kind of muscle to resist constant attack of abrasion, corrosion, bending fatigue, load strain and shock stress.

Complete quality control of Wickwire Rope means that you can always count on the right grade of steel and size of wire; the right construction and lay of the rope for best results on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

THE COLORADO FUEL AND IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa

THE CALIFORNIA WIRE CLOTH CORPORATION — Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane

WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE

A CF&I PRODUCT

1221

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

*QUARTER-MILE ROADBED...sun-baked, ice-swept...*YET STILL ON THE MOVE AFTER 14 YEARS OF COAL HAULING SERVICE!!!

Photographs may not lie; but, here's one that falls far short of telling the whole truth about the remarkable performance records chalked up by this Republic Rubber's Coal Handling Conveyor Belt.

But, then it's quite a story! You can see for yourself there's lots of sky overhead and that means sun . . . constant, unrelenting sun beating down on the conveyor belt surfaces, until seasonal changes bring about onslaughts of rain, snow and sleet.

The load, of course, is coal . . . an abrasive, mine run coal that's dropped through chutes and carried by the belt to stockpiles located throughout the dock area.

With these facts in mind and knowing that when the ship moves out, there's nothing to protect the belt against spraying lake water, consider this:

The belt is now fourteen years old and still going strong!!!

Purposefully, we've left the photo unretouched to show you just what a 14-year old Republic Rubber Conveyor Belt really looks like . . . to show you just how well a Republic Conveyor Belt stands against the ravages of time, hard labor and all the elements can throw at it. Incidentally, the dark spots you see on the belt's surface aren't worn places at all. That's water . . . water that makes ordinary conveyor belts mildew and prematurely fail, but holds few terrors for Republic Conveyor Belting because they're "mildew-proofed"!

It's to your advantage to learn why Republic Conveyor Belts like this can year in, year out, many times outperform and outlast other brands of belting.

Despite abrasion, impact, flexing, weathering or contact with heat, oil and chemicals, Republic Conveyor Belts continue to be your best insurance against breakdowns, short life and high handling costs.

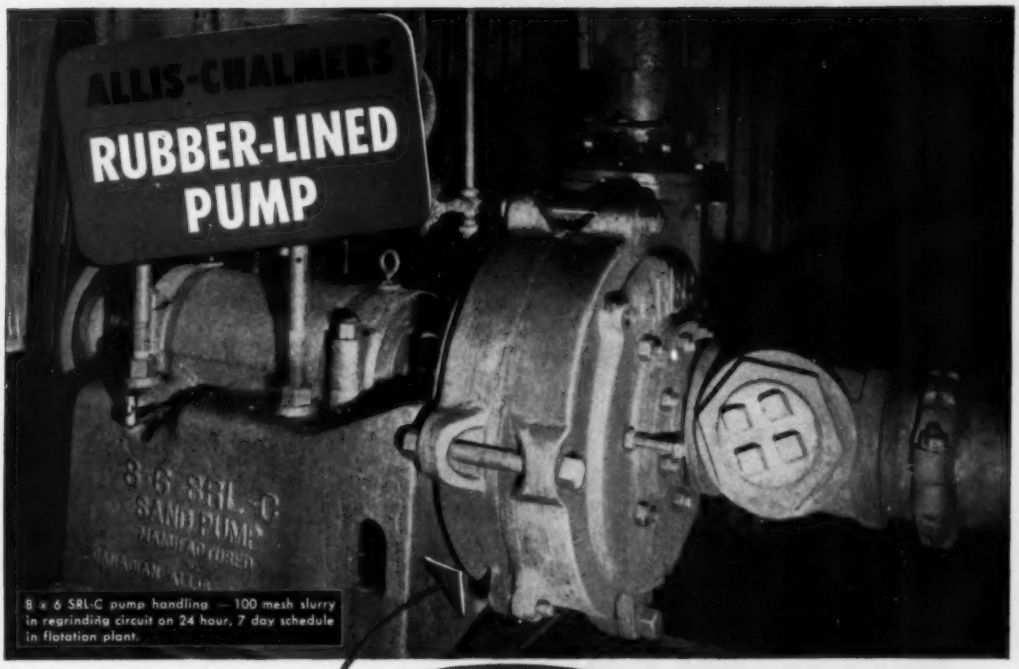
Write us today for the name of your local Republic Rubber Distributor who can offer expert advice and fast service on all industrial Rubber Products.

Remember, whether it's hose, belting, packing or any one of hundreds of different molded and extruded specialties . . . **if it's built of rubber, Republic builds it better!**

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS



8 x 6 SRL-C pump handling — 100 mesh slurry in regrinding circuit on 24 hour, 7 day schedule in flotation plant.

Here's How THIS PUMP Cuts Slurry and Slime Pumping Costs

SPECIAL RUBBER COMPOUNDS, engineered to fit each application, resist wear of even the most abrasive slurries and slimes. Original capacity and efficiency are maintained over long periods. Records show that the Allis-Chalmers rubber-lined pump has a service life 10 to 50 times greater than the finest alloy pumps when handling finely divided, highly abrasive materials. This means that the higher price of the rubber-lined pump is saved many times over in lower maintenance cost and less lost production due to shutdowns. The stuffing box, too, is specially designed to reduce packing wear.

EASY MAINTENANCE

Maintenance on the Allis-Chalmers rubber-lined pump is easy. All parts normally requiring attention are accessible for inspection, adjustment or replacement. The casing can be parted easily when impeller and liners must be checked. The stuffing box is easy to work on.

The casing liners are of unique construction. The rubber compound is pressure-molded to steel frames. The liners fit into casing easily and are held securely in place by studs which are part of the steel frame and are securely embedded in the rubber. Liners and the impeller can be renewed without removing the pump from its location and spares can be kept on hand.

COMPETENT APPLICATION ENGINEERING

Allis-Chalmers application engineers are thoroughly familiar with all types of solids pumping problems. Allis-Chalmers can furnish you a complete pumping unit — pump, motor, control and drive — all of coordinated design and manufacture. For help on your solids pumping problems, call your nearest Allis-Chalmers District Office. For more information on the A-C Rubber-Lined Pump, write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B7311.

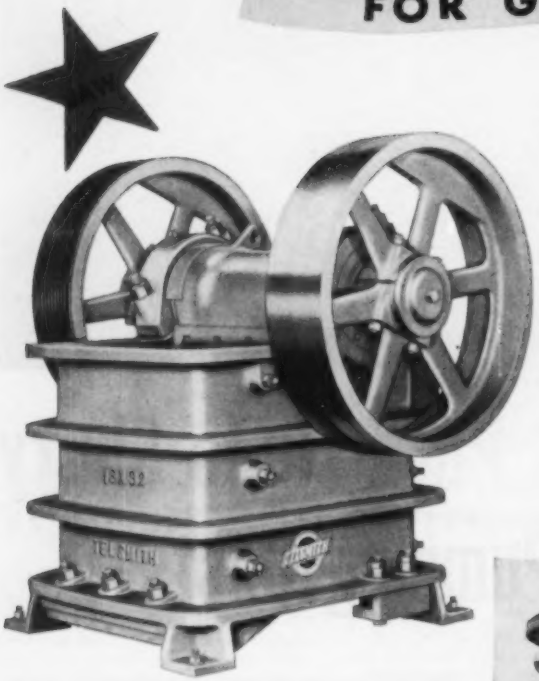
A-3897

ALLIS-CHALMERS

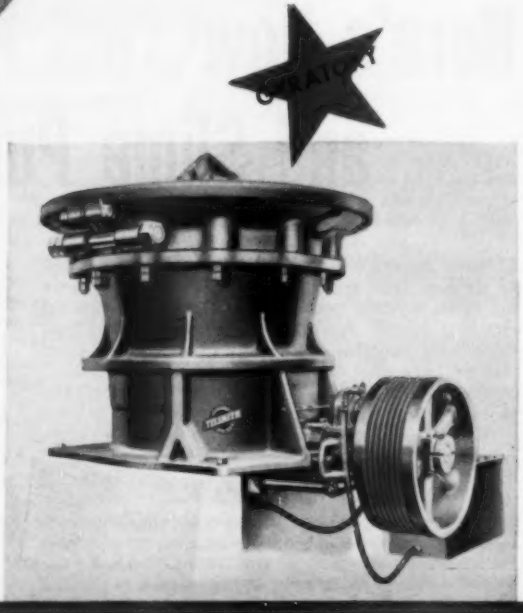
TELSMITH®

PRIMARY

FOR GREATER CAPACITY



● **Telsmith Jaw Crusher** has a compact, massive cast steel frame and swinging jaw . . . with large cylindrical roller bearings throughout for higher speed, bigger capacity, and lower power requirements. With its vigorous, force feed, and remarkably effective crushing action, the Telsmith Jaw Crusher turns out a more uniform and cubical product, in larger capacities. Its easy, simple adjustment allows a wide product size range. Made in 9 sizes, from 10″ x 16″ to 30″ x 42″, 22 to 240 tons per hour. Send for Bulletin 280.



● **Telsmith Gyratory Breaker** is short and compact. Steel frame and crown, and rigid pillar shaft are all guaranteed against breakage. Largest feed and crushing areas of any gyratory breaker . . . the famous Telsmith parallel-pinch crushing stroke . . . cut steel drive gears, improved full, force-feed oiling and a roller bearing countershaft give not only faster crushing but crushing by impact, for a better cubical product. 7 sizes: 6B to 25B, 26 to 400 tons per hour. Get Bulletin 281.

SMITH ENGINEERING WORKS

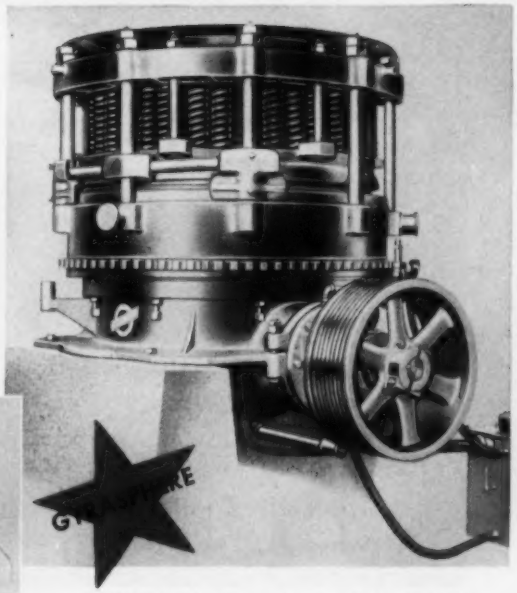
504 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

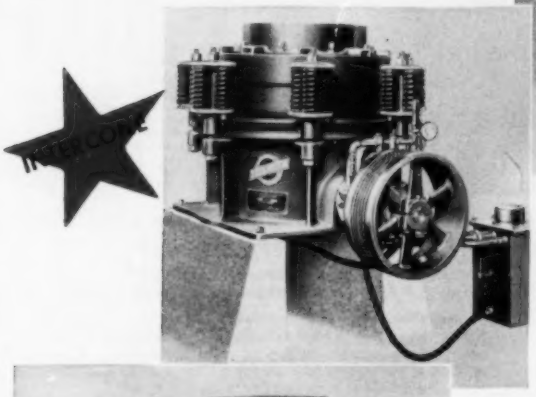
CRUSHERS

SECONDARY

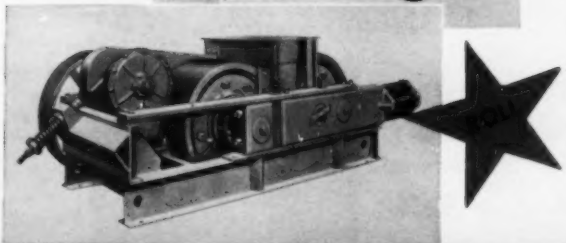
LOWER COSTS • BETTER PRODUCTS

● **Telsmith Style S Standard Gyrasphere** has new, heavier design with many time-tested features for greater capacity, a more uniform product, low-cost operation, and quick accessibility for easier maintenance. 24″ to 48″ sizes, coarse or medium bowl; 45 to 300 tons per hour. New 489-S size has 10″ receiving opening. *Style FC Fine Crushing Gyrasphere* has all Style S features with several additional fine crushing improvements. 24″ to 48″ sizes; medium or fine bowl, 15 to 125 tons per hour. Send for Bulletin 274.





● **Telsmith Intercone** is an all-steel, high-speed, lower priced secondary crusher. Turns out very uniform, cubical, coarse or intermediate product. Lead bronze bearings, Telsmith patented rotary seal, roller bearing countershaft, full force feed oiling, spring relief protection. 18″ to 28″ sizes; 26 to 70 tons per hour. Get Bulletin 270.



● **Telsmith Double Roll** for large capacities of intermediate or fine aggregate at low reduction ratios. Compact, light in weight, low in cost. Anti-friction bearings run in oil. 24″ x 16″ to 40″ x 22″ sizes. 75 to 132 tons. Get Bulletin 282.

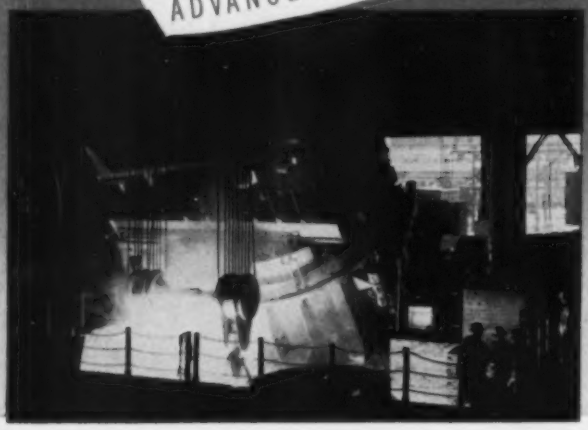
CS-8

Cable Address: Telsmith, Milwaukee
[illegible]

Steel

BULWARK OF FREEDOM AND...

LABORATORY FOR THE ADVANCEMENT OF QUALITY



Another Electric Furnace Increases Sheffield Steel Making Capacity
At both the Houston and Kansas City Sheffield steel mills, ultra modern electric furnaces supplement the many open hearth furnaces in making Sheffield Steel. Also added to Sheffield's steel making facilities is a new and modern laboratory.

Steel enters into every product. Steel is either a part of the product or is used in its production—or both.

Advancement of quality in many products very often must begin in the steel maker's laboratory.

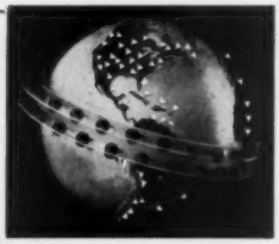
At Sheffield Steel Mills is the most versatile metallurgical laboratory West of the Mississippi and East of the Rockies. It is complete with chemical and physical equipment. Its technical staff continuously searches for improved formulae for a wide diversity of steels and for better processes of heat treatments under automatic pyrometric control.

Then, from raw materials to finished steel, samples are micro and macro etched and photographed for metallurgical observation of porosity, grain structure and faults. The physical laboratory constantly runs impact, fatigue, tensile and hardness tests including stress-strain diagrams.

And, Sheffield's advancement of quality to higher and higher levels goes beyond this. Inspection data is analyzed at every step of manufacture by statistical methods. Thus statistical quality control quickly points out the slightest variation from the high uniform level prescribed.

SHEFFIELD STEEL CORPORATION
HOUSTON KANSAS CITY TULSA
SUBSIDIARY OF ARMCO STEEL CORPORATION

SHEFFIELD MOLY-COP
COPPER-MOLYBDENUM ALLOY
Grinding Balls
USED and PROVED ALL AROUND THE WORLD



Other SHEFFIELD STEEL Products

Plates, Sheets, Merchant Bars, Steel Joists, Structural Shapes

Reinforcing Bars, Welded Wire Mesh, Wire Products, Wire Rods, Fence, Spring Wire, Nails, Rivets

Grinding Media, Forgings, Track Spikes, Bolt and Nut Products

ANNOUNCING

A new Dodge truck parade of power!

NEW! More powerful engines!

A parade of power! See the new Dodge "*Job-Rated*" trucks at your Dodge dealer's today. A total of 7 big, rarin'-to-go engines, including 3 brand-new power plants with high compression ratios and higher horsepower, greater cooling capacity, increased displacement, twin carburetion available on larger models. Plus famous features like 4-ring pistons with chrome-plated top ring, exhaust valve seat inserts.

In addition, the new Dodge trucks offer outstanding new brakes, new no-shift transmission, and over 50 other new features. See your Dodge dealer for the biggest truck buy on record!

For a truck, ½-ton through 4-ton that fits the job, see the NEW...

NEW! Extra-powerful brakes!

Stop easily on steep grades, fully loaded. Super-safe brakes give silky-smooth braking, reduced driver fatigue, greater load protection . . . new increased stopping ability on 1- through 2½-ton trucks! *PLUS* Dodge's oversize braking surface with Cyclebond linings.

NEW! Truck-o-matic transmission!

New Truck-o-matic transmission . . . available on ½- and ¾-ton models of Dodge "*Job-Rated*" trucks . . . saves shifting, cuts driver fatigue, lets you rock out of snow, mud, sand. Only Dodge offers shift-free Truck-o-matic! *PLUS* famous gyrol Fluid Drive, to lengthen truck life, protect your load.

NEW! Over 50 features!

50 ways new! Reinforced cab construction, improved exhaust system, extra-capacity radiators. Tinted glass, heaters with stepped-up heat output available. *PLUS* moistureproof ignition, high-torque capacity starting motors, and other dependability features. See your Dodge dealer.

DODGE "Job-Rated" TRUCKS

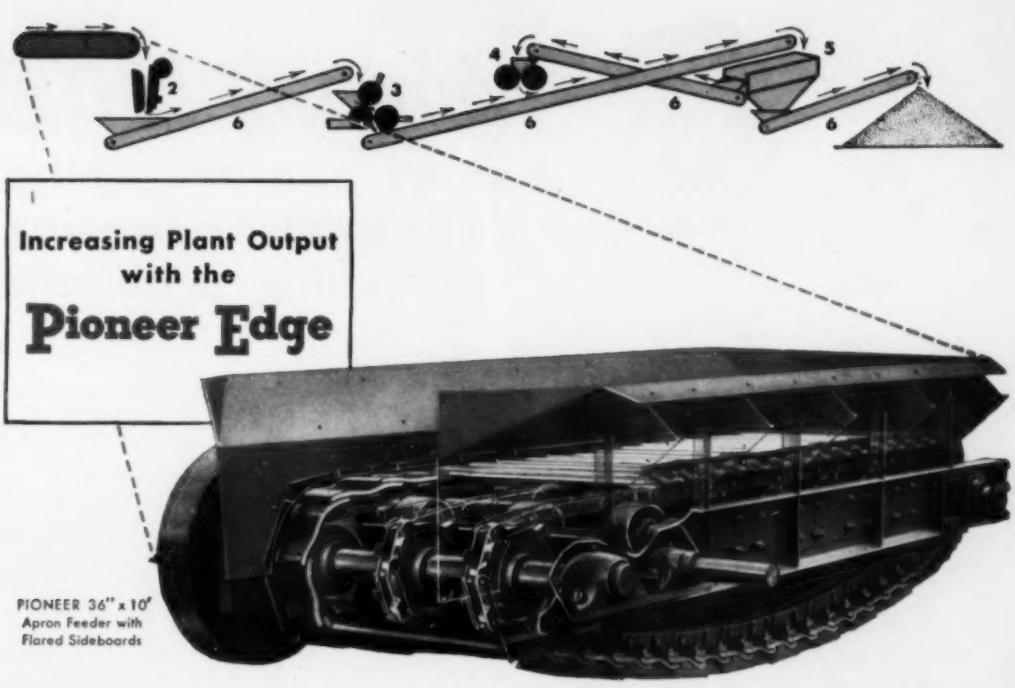
At your dealer's, Thursday Dec. 4th

HELLO...BEMIS? I WANT TO ORDER A CARLOAD OF MULTIWALLS. WHEN DO YOU THINK...OH! HERE THEY ARE! WHAT TOOK YOU SO LONG?
BEMIS
Paper Shipping Sacks
MULTIWALL
BEMIS MULTIWALL

Don't pin us down to that, please. But, no fooling, the twelve Bemis multiwall plants, strategically located coast to coast, mean that at least one is conveniently close to you. This time-saving means money-saving. Ask your Bemis Man for details.

Bemis

General Offices — St. Louis 2, Mo.
Offices in all Principal Cities



Increasing Plant Output with the

Pioneer Edge

PIONEER 36" x 10' Apron Feeder with Flared Sideboards

Control the feed...Increase production!

WANT to squeeze every possible ton of material through your plant that it's able to handle?

Then consider the Pioneer Apron Feeder, and how it takes over the job of keeping the primary crusher going at top capacity by feeding a continuous, even flow of material at all times. No surges to choke the crusher . . . no voids to make it run empty.

Here again is the famous PIONEER EDGE in action, for these rugged Feeders are built to take the heaviest impact, the heaviest dump loads from the quarry or mine. Available with straight, flared, or no sideboards, and with a type of drive to fit any installation.

FEATURES

1. ½" thick forged steel pans, rigidly supported by rollers, take heaviest shock loads. *No thicker pans available on any comparable feeder.*

2. Pans are overlapped to give extra strength and rigidity. Provide corrugated surface which reduces slippage.

3. Sideboard wear plates are easy to change.

4. Quick-acting clutch or push button operation gives precise control of flow

SPECIFICATIONS
PIONEER APRON FEEDERS

Width of Feeder	Capacity in tph at specified ft. per minute				Approx. wt.* with flared sideboards
	15'	20'	25'	30'	
30"	112	148	186	226	7140
36"	162	216	270	310	7895
42"	222	294	369	444	8490
48"	289	386	482	575	9225

*10 foot length, built-in speed reduction for use with crusher

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

Pioneer *Continuflo* **EQUIPMENT**

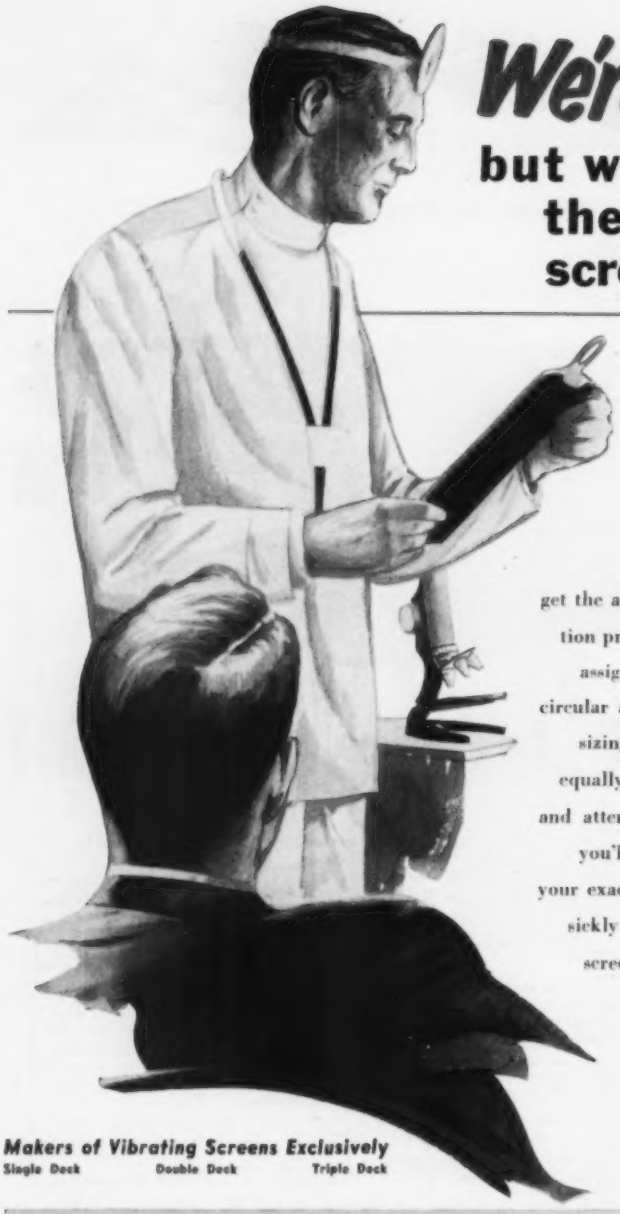
Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

- ☐ GRAVEL PLANTS
- ☐ WASHING PLANTS
- ☐ MECHANICAL FEEDERS
- ☐ ROCK PLANTS
- ☐ BITUMINOUS PLANTS
- ☐ VIBRATING SCREENS
- ☐ JAW CRUSHERS
- ☐ APRON FEEDERS
- ☐ BUZZER SCREENS (LIGHT DUTY)
- ☐ ROLL CRUSHERS
- ☐ ORE FEEDERS
- ☐ CONTINUFLO CONVEYORS

Name _____
Company _____
Address _____
City _____ *Zone* _____ *State* _____

We're not MD's

but we can prescribe the answer to your screening problems



Whether your screening involves fine or coarse materials, or both: whether you want to make one size or ten... you can have a "healthy," trouble-free screening operation with Seco on your job! Here is why! First, you get the advantages of Seco engineering and construction proved in use on thousands of tough screening assignments. *Only* Seco has fully controlled true circular action, the key to better tonnages, accurate sizing and minimum maintenance. Second, but equally important, you get the personal interest and attention of screening specialists. This means you'll get the right screen or screens to meet your exact requirements. Don't put up with a tired, sickly screening setup any longer. Call in Seco screening specialists now. Write, wire or phone.

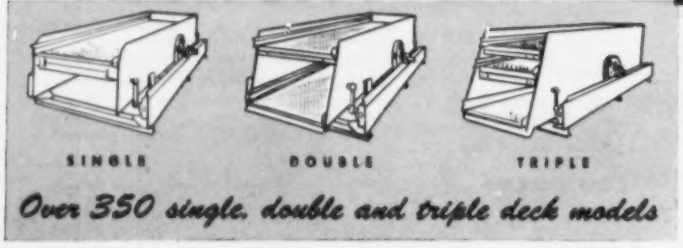
Makers of Vibrating Screens Exclusively

Single Deck Double Deck Triple Deck

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS



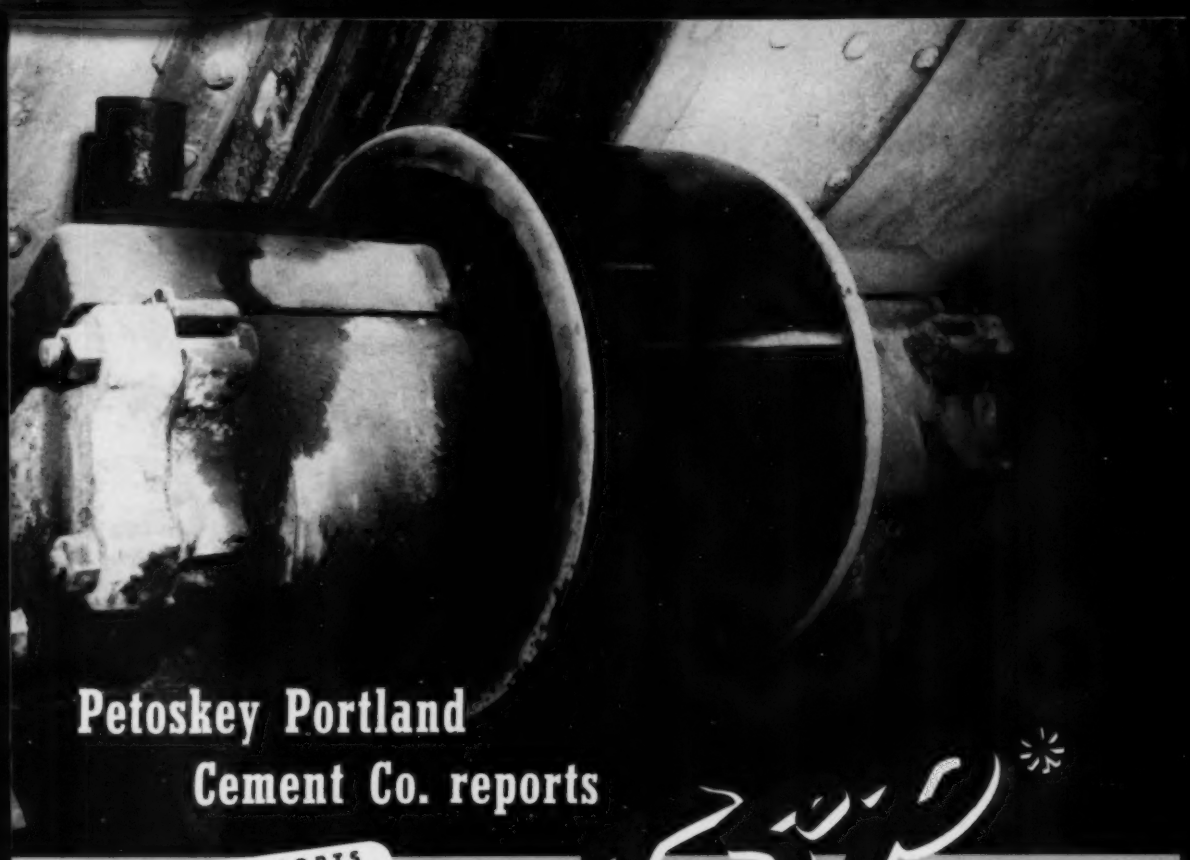
Over 350 single, double and triple deck models

SCREEN EQUIPMENT CO. INC.

1750 Walden Ave. Buffalo 25, N.Y.

In Canada: United Steel Corp.

Toronto, Ontario



Petoskey Portland Cement Co. reports TSP* trunnions outlast them all!

INDUSTRY REPORTS

Excerpt from letter, Petoskey Portland Cement Co.,

"...on our #1 kiln we ran one (TSP Trunnion) 7 years and one 8 years before replacing bearing...on # 2 kiln we ran one 12 years and one 11 years...on #3 kiln, 6 years, 7 years and 8 years...on #4 kiln, 10 years and 8 years...also good results with both TSP rolls and shafts..."

Petoskey Portland began installing "Tool Steel Process" Trunnions in 1940, completed installation on all 4 kilns by 1943. None has worn out to date. Eighteen TSP Trunnions are now in use. In addition to their long service life, they have been instrumental in smoothing the surface of the large tires.

TSP Shafts installed with these TSP Trunnions are showing the same phenomenal results. Prior to the installation of TSP Shafts, bearings had to be renewed every 2 years.

Next time you need replacement parts, specify "Tool Steel Process" parts. Savings in material, man hours and downtime will prove to you TSP superiority, as it has to hundreds of companies.

* TOOL STEEL PROCESS PRODUCTS

...the products that carry an absolutely positive GUARANTEE to give a longer life in the same service than any other product.

THE TOOL STEEL GEAR AND PINION CO.

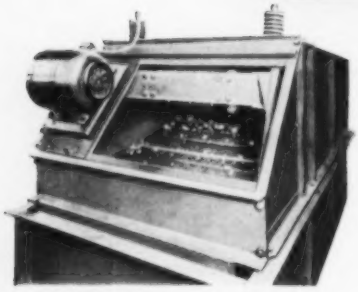
CINCINNATI 16, OHIO, U. S. A.

AD 89

THE STANDARD OF QUALITY SINCE 1909 FOR GEARS • PINIONS • ROLLS • WHEELS AND OTHER HARDENED PRODUCTS

Here is the screen you need for extremely *fine* separations

...the new "SYMONS" V SCREEN



"SYMONS" ROD DECK SCREEN . . . employs a highly efficient screen deck, utilizing individual replaceable spring steel rods. Features low screening cost—big capacity—low maintenance—long life—ideal for moist and sticky materials.

THE "SYMONS" V (vertical) Screen is the newest addition to the well-known line of "SYMONS" Screens . . . and provides extremely fine, single cut wet or dry separations.

Revolutionary in design, and operating with a combination of centrifugal action and gyratory movement, this new screen has proved ideally suited for sand, gravel and crushed stone plants—metallic and non-metallic mining—chemical plants—cement plants—coal preparation plants—and scores of other industrial applications.

Requiring a minimum of floor space, the "SYMONS" V Screen is easily installed, and provides fully enclosed construction to assure dustless operation—yet access to the screen is simplified through easily removable covers. *Write for further details.*

NORDBERG MFG. CO., *Milwaukee, Wis.*

S252

"SYMONS" . . . a Nordberg trade mark known throughout the world

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO
MEXICO, D. F. • LONDON • PARIS • JOHANNESBURG

"SYMONS" Primary Crushers

Grinding Mills

Mine Hoists

"SYMONS" Vibrating Bar Grizzlies and Screens

Diesel Engines

ONLY HUDSON GUARANTEES TO REPLACE MULTIWALL SACKS DAMAGED ON YOUR PACKER

Exceptional quality of Hudson Multiwall Sacks permits unusual guarantee

PALATKA, FLA. Heretofore each Multiwall Sack user has individually absorbed the cost of any sacks which break on his filling and closing machines. But now, Hudson becomes the first and only Multiwall Sack manufacturer to guarantee to replace such broken sacks at no further cost.

According to experts, the average user of Multiwall Sacks normally expects to write off the loss of certain sacks during each day's run. These sacks are damaged due to circumstances beyond control of the Multiwall Sack manufacturer. Overloading of sacks, malfunction of packing or closing machines, or inattention on the part of the operator are some of the common causes of sack breakage.

Hudson is confident that the quality of the Multiwall Sacks they produce can eliminate most of this breakage. That is why they are willing to offer you complete protection through filling and closing operations. Only a company with a superior product would dare offer their customers such a guarantee.

First in industry to offer this replacement guarantee

T. H. Mittendorf

NEW YORK CITY. "Hudson is the first and only Multiwall Sack manufacturer to offer a written replacement guarantee on breakage of Multiwall Sacks," declared T. H. Mittendorf, Hudson's Vice President in Charge of Sales. "Hudson Multiwall Sacks lead the industry as being the world's most fully guaranteed. We believe they represent the best buy on today's market."

Hudson Representative, Harry Rafferty (center), points out the packing and closing operations covered by Hudson's new guarantee, to J. Dummett (left), Plant Supt. for Wedron Silica Company.

"Under the terms of our unusual guarantee the buyer is protected from the moment he accepts custody of the sacks until the sacks have successfully passed his filling and closing operations. This guarantee greatly extends our usual warranty of quality and workmanship," Mr. Mittendorf pointed out.

Goes into immediate effect

The new Hudson guarantee plan went into effect with all sacks purchased on or after Sept. 15, 1952. Early reports indicate that the guarantee is being enthusiastically received.

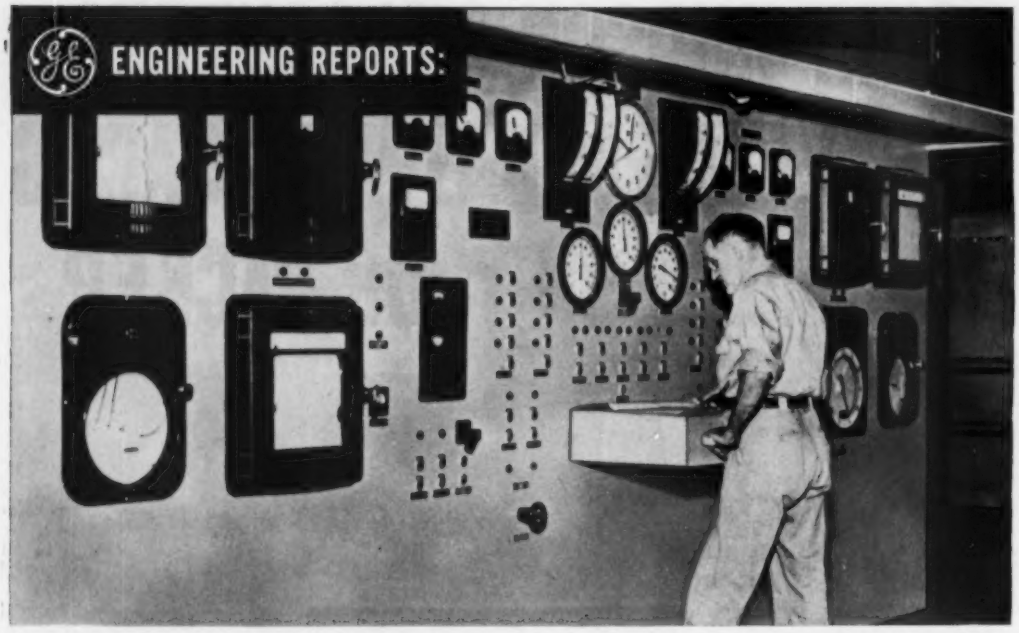
Prompt delivery on all contracts are assured by the tremendous capacity of Hudson's fully integrated mill at Palatka, Fla. High quality is maintained through inspection and controls at every step from tree to the finished Hudson Multiwall Sack. Hudson packaging engineers see that sacks conform to the exact needs of each user.

Urge Multiwall Sack users to write for facts

The Hudson Pulp & Paper Corp. invites all users of Multi...ks to learn how th...y by usin...wall ...ee ...lets ...and ...y are promised!

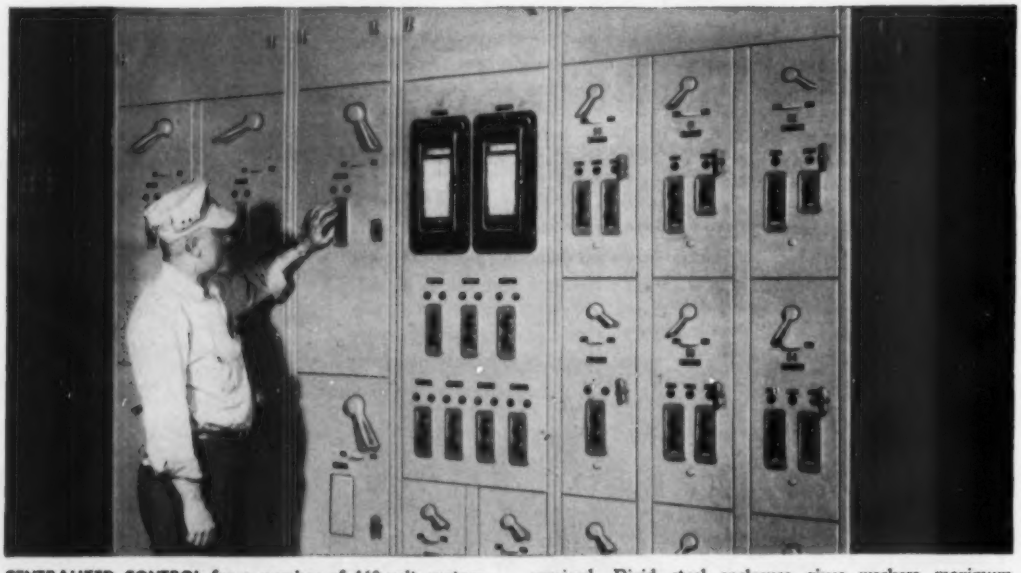
Hudson Multiwall Sacks are available pasted or sewn, and in valve and open mouth styles.

Hudson Pulp & Paper Corp.
Dept. 102, 505 Park Ave., New York 22, N.Y.



ONE MAN REGULATES all kiln-department functions at a control board in this large western cement plant. Built-in instruments indicate and record necessary data on all department drives, kiln temperatures, gas pressure, etc. The multiple-control panel has interlocked circuits so that kiln operations will be performed with greater efficiency and safety.

Centralized control increases



CENTRALIZED CONTROL for a number of 440-volt motors can be provided by a compact assembly of low-voltage G-E Cabinetrol*. Factory wired, it's easily planned, installed and serviced. Rigid steel enclosure gives workers maximum protection, resists entrance of cement dust.

*Registered trade-mark of General Electric Co.

MANPOWER-SAVING, this G-E control station in a Colorado cement mill brings all related processes in a department under control of one man, provides faster, more uniform production.

SPACE-SAVING, this G-E Limitamp high-voltage motor control combines starters and short-circuit protection in one unit. This lineup controls four 4160-volt synchronous motors.

cement output, saves manpower

Modernizing electrically with centralized control lets you co-ordinate plant operations more closely

Centralized control—as part of a comprehensive program of electrical modernization—can help you make most efficient use of your available manpower. It takes fewer steps by fewer men, for example, to co-ordinate related operations in a cement plant from General Electric control stations. And with interlocked G-E multiple control panels, you can help prevent production tie-ups, keep plant processes flowing evenly.

SYSTEM-ENGINEERED TO YOUR NEEDS

Engineered by skilled G-E industry specialists into a complete system to meet your individual needs, these centralized controls play a big part in moving uniform-quality cements through your plant—continuously, at a maximum rate, with minimum man-hours. Whatever department you plan to modernize—crushing, grinding, kiln, finish, or packhouse—let a G-E cement-industry specialist work with you from the start in planning an electric system that is reliable, safer, amply suited to your requirements.

MODERNIZE STEP BY STEP

Meanwhile, for mill-tested ideas you can use to increase your plant's capacity, send for a new G-E booklet just released. It shows how to modernize electrically to increase tomorrow's production, how to do it step by step to keep today's production going. For your copy, contact your nearest G-E Apparatus Sales Office and ask for Bulletin GEA-5469, or write to General Electric Company, Section 658-9, Schenectady 5, N. Y.

Engineered Electrical Systems for Rock Products Industry

GENERAL ELECTRIC

Even a Boy can fight Communism with Truth

Kids on Radio Free Europe Send Hope To Pals Behind Iron Curtain

Twelve-year-old Karel Paces, a young Czech found in a German refugee camp, is broadcasting over Radio Free Europe to his Czech friends behind the Iron Curtain.

He is telling them familiar children's stories in their native tongue—stories now denied them by their Communist masters. These stories have a very real meaning to Karel's friends, a meaning ingrained in the folklore of their country.

Karel Paces is giving his friends, the boys and girls of his beloved Czechoslovakia, the truth of their own country and the free world. It is this truth which every American must support now so that it can be used to fight the deceit, darkness and despair which Communist tyranny is spreading through the satellite countries of Europe.

Day and night, Radio Free Europe is exposing Communist lies and propaganda, and sustaining the hope of oppressed millions that some day they will live in a better world.

At least $4,000,000 is needed this year to support and expand the operations of Radio Free Europe and Radio Free Asia. In addition, the Crusade for Freedom is seeking the signatures of Americans, on Freedom-Grams. These will be your personal pledges of hope for a free world.

This Crusade cannot succeed without your help. Your contribution is needed *now* to help support Radio Free Europe and Radio Free Asia . . . to help fight red lies with truth and to win the cold war.

Support this truth campaign now and help bring to millions the promise of future freedom.

Send your contribution to Crusade for Freedom, c/o your local Postmaster

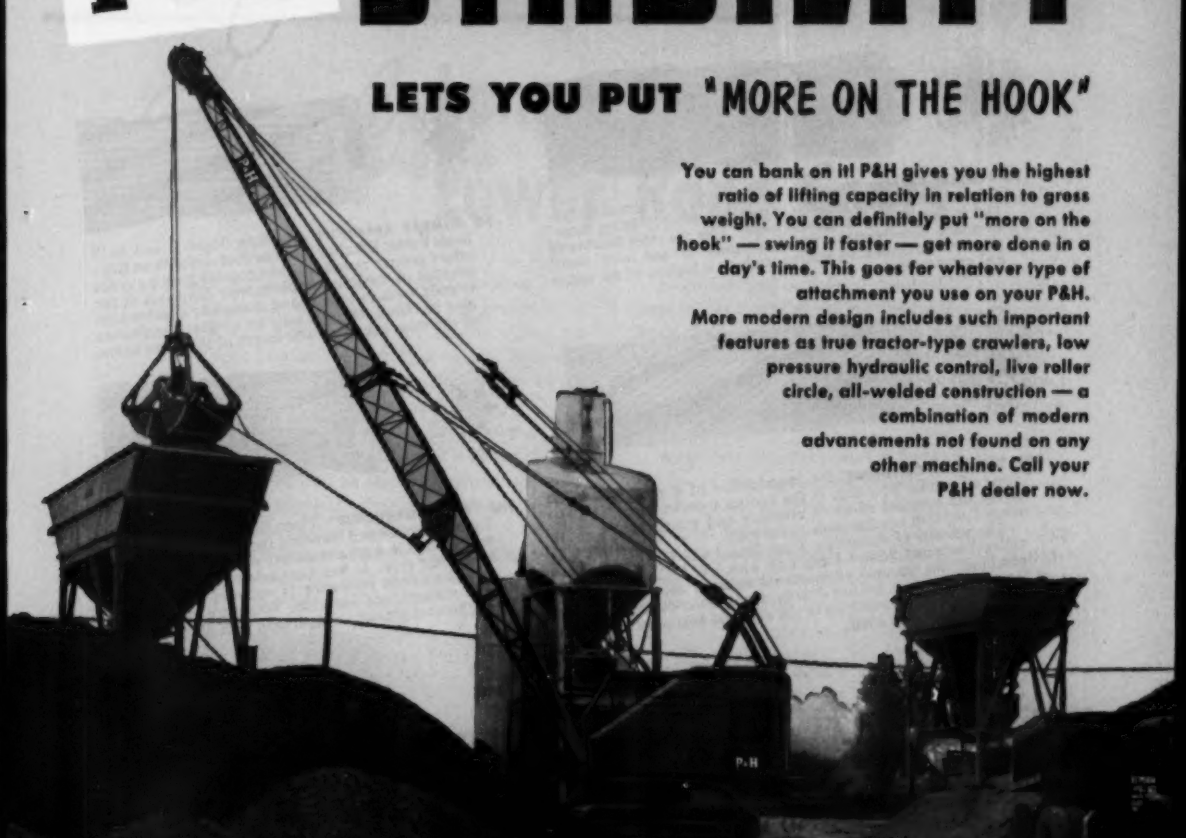
Help Truth Fight Communism
Give To Crusade For Freedom

Contributed in the public interest by

PIT and QUARRY

P&H STABILITY

LETS YOU PUT "MORE ON THE HOOK"



You can bank on it! P&H gives you the highest ratio of lifting capacity in relation to gross weight. You can definitely put "more on the hook" — swing it faster — get more done in a day's time. This goes for whatever type of attachment you use on your P&H. More modern design includes such important features as true tractor-type crawlers, low pressure hydraulic control, live roller circle, all-welded construction — a combination of modern advancements not found on any other machine. Call your P&H dealer now.

HARNISCHFEGER CORPORATION...

4400 WEST NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

YOUR P&H DEALER IS READY WITH ALERT SERVICE AND GENUINE P&H PARTS TO KEEP YOUR JOBS ON SCHEDULE.

P&H Power Shovels and Truck Cranes are more easily converted for various types of service because hoist and digging drums are on one shaft. The need for auxiliary shafts and gearing is eliminated. Write for literature on the size you need. Sizes up to 8 cu. yds., gasoline, diesel or electric power.

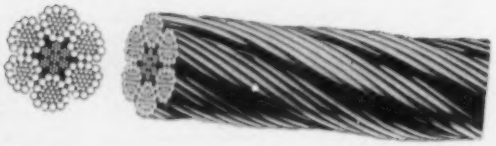
the P&H Line

SHOVEL · DRAGLINE · BACKFILLER · CRAWLER CRANE · MAGNET CRANE · TRENCH HOE · PILE DRIVER · TRUCK CRANE

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

The Proper Rope Plus

TO COMBAT FATIGUE Tiger Brand 6x37—Type S Excellay Preformed. This rope is listed as "Special Flexible Hoisting Rope" and is also known as "Crane Rope." It is the most flexible of standard constructions which permits its use with small sheaves and drums. Its reserve strength is highest of the standard constructions.



FOR RESISTING CRUSHING, the introduction of a steel core instead of regular fiber core in the various types of ropes, minimizes the harmful effect of crushing and maintains the intended position of all strands in the rope.

The section of American Tiger Brand 6x30 Type G Excellay Flattened Strand Lang Lay with I.W.R.C. as shown, combines the features of increased strength because of the large metallic area, greater distribution of wear on the outside wires, resistance to crushing of the core and flexibility because of the type of rope itself.

TO COMBAT ABRASION American Tiger Brand 6x19 Seale Patent Excellay Monitor Preformed Wire Rope offers greater resistance than regular hoisting ropes because of the large, uniform wire diameters of the outside wires in each strand. Lang Lay construction also increases the resistance by a better distribution of the wear over a greater length of the outer wires.

THE "OLD WORKHORSE" Tiger Brand 6x19 Type N Excellay Preformed Standard Hoisting Rope is more widely used in a greater variety of applications than any other type. It has a superior combination of qualities—good resistance to abrasion and fatigue, high strength and long life. With wire core it has 7½ percent greater strength than with fiber core.

More than a million tons of oyster shells have been converted into chemicals at this plant. The owners have found that Tiger Brand Wire Rope stands up best under these severe abrasive conditions, cutting rope costs, reducing down time and keeping equipment at top capacity.

The slings the thing, especially when you are handling heavy lifts such as the machinery shown here. And Tiger Wire Rope Slings are designed to handle all jobs promptly, safely and economically. They are made of the toughest, strongest wire rope manufactured, and come in many types. Write for our book, "American Tiger Wire Rope Slings."

Proper Maintenance

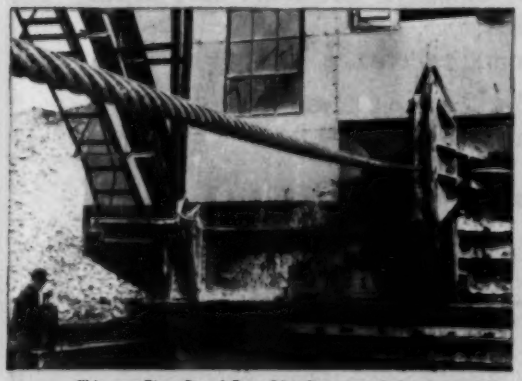
Equals Longer Rope Life Lower Rope Costs

● Many prominent users of wire rope have found they can reduce wire rope costs as much as 50% by using a wire rope designed for the job. They get better rope service at lower rope cost by following this simple, job-tested system, with the help of the Tiger Brand Wire Rope Specialist.

Let this qualified expert make *sure* that you select, for each job, a wire rope that is strong enough to carry the load with an ample margin of safety . . . able to stand incessant flexing and sharp bending without failure of wires due to fatigue . . . built to take the most severe abrasion and crushing. Then make sure that every foot of wire rope you own is inspected, cleaned and lubricated *regularly*.

Engineers and contractors who follow this procedure tell us that they are getting twice—sometimes three times — the life they expected from Tiger Brand Wire Rope, plus greater safety for crews and equipment and freedom from rope-caused work stoppages, all of which means important money savings.

When you are in the market for wire rope, make full use of the engineering knowledge of an expert who has made a life-work of analyzing and solving wire rope problems. Just drop us a line and your Tiger Brand Wire Rope Specialist will be glad to consult with you. Meanwhile, why not send in the convenient coupon for a copy of our latest book?



This new Tiger Brand Drag Line Rope was designed especially to resist the extremely severe operating conditions encountered in this class of service. On one job where ropes lasted an average of 600 hours, this Tiger Brand Drag Line Rope was still going strong after 1100 hours—believe it or not!

Send for This NEW BOOK

It contains specification data that will help you select the right rope for each application. In descriptive text, illustrations, diagrams and tables, it gives you complete information on types of rope, diameters, working loads and safety factors for all sorts of rope service.

American Steel & Wire
Rockefeller Building, Dept. H-11
Cleveland 13, Ohio

Please send me your new book, "Specification Data, Tiger Brand Wire Rope."

Name.....

Company.....

Address.....

City.....Zone..State.....

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

Pit and Quarry Helps You Operate More Profitably

Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you practical ideas on every phase of your operations.

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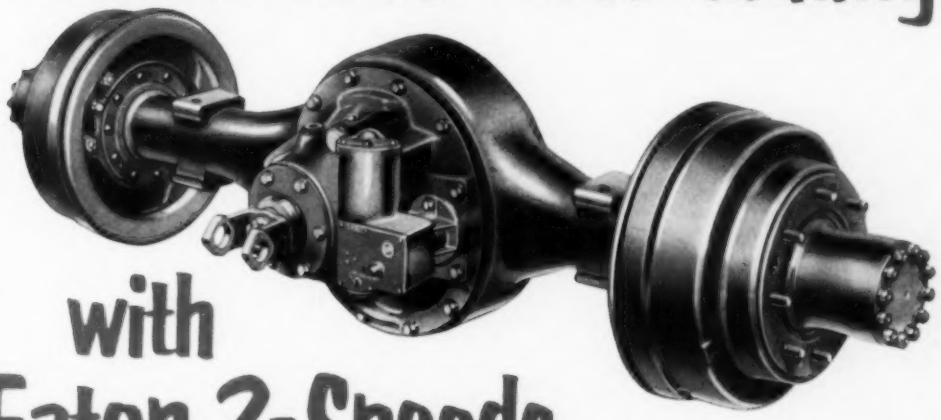
We Produce ....

QUALITY . . . from raw material to finished axle, means lower-cost hauling



with Eaton 2-Speeds

Exacting standards of quality, maintained by the most advanced quality control procedures, combine with the Eaton design to produce axles which are setting unequalled performance records at minimum cost per mile. Quality, plus Eaton's exclusive planetary gearing, forced-flow lubricating system, and positive shift control, keep Eaton 2-speeds on the job, out of the repair shop.

Let your dealer explain how Eaton 2-speeds provide the right ratio for every road and load, cut maintenance cost, make trucks last longer—and worth more on the trade-in.

EATON *2-Speed Truck* AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

INSIST ON ADEQUATE ROADS

EATON

Today, America's roads are crowded with twice the traffic they were designed to carry. Help end the national traffic jam by speaking up for more and better roads.

VOL. 45 DECEMBER 1952 No. 6

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PIT AND QUARRY

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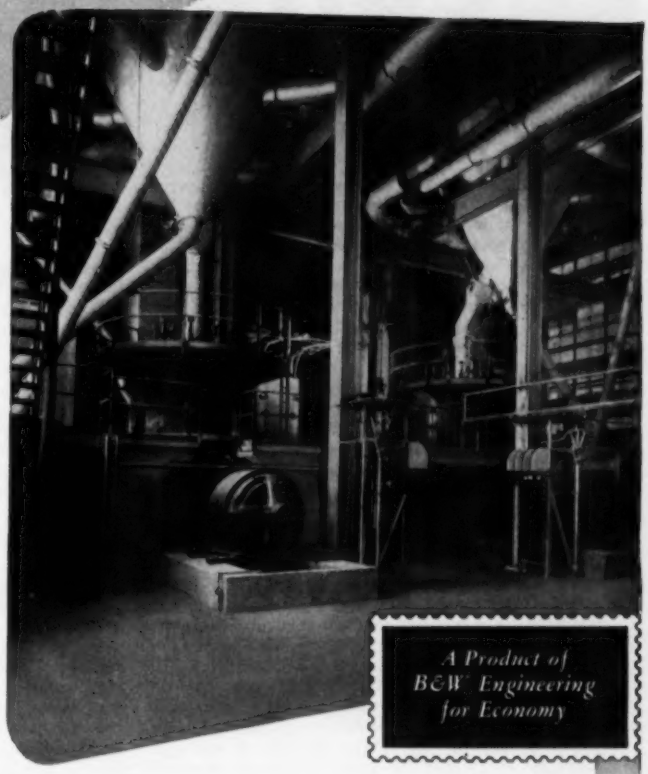

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editorial

Percentage Depletion Can Be Taken Away!

PERCENTAGE depletion for all the nonmetallic minerals industries has now been an accomplished fact for over a year, and all producers have been eligible for its benefits for nearly two years, as of January 1, 1950. Percentage depletion for many of these industries was obtained only after a long and hard struggle; but already, we fear, many producers are taking it for granted, regarding percentage depletion as something they are entitled to and which cannot be taken away from them. It is true that they are entitled to it—but it can be taken away. The percentage depletion provision of the Revenue Act of 1951 (H. R. 4473) met with powerful opposition, and the entire principle involved will continue to be attacked before future sessions of Congress. Unless proper steps are taken to keep percentage depletion sold, it can be taken away from these industries.

Many producers, especially members of those associations which fought so hard and long to obtain percentage depletion for their industries, are aware of this possibility and are doing everything they can to keep it. Many others, however, are doing nothing. All are helping to lose percentage depletion if they do not actively keep selling it, not only to their congressmen but to the public in general.

PERCENTAGE depletion is not a gift, a bonus, or a subsidy. It is a measure in the public interest to insure the continued availability at reasonable cost of basic raw materials vital to our economy and to the future safety and prosperity of our country. For many years the best and most economically available deposits of nonmetallic minerals have been worked in profligate fashion with little thought of the future. Because it was convenient to do so, some of our highest grade raw materials were sold for purposes which required much less quality; some deposits were worked to only a fraction of their depth and then covered up with overburden or allowed to flood so that the remaining material can be reclaimed only at great cost; most deposits, however, were just worked out. Mineral deposits are not replaceable, as no more are being made. Once gone, they are gone forever.

Many nonmetallic minerals producers each year are being forced to abandon worked-out deposits. In some areas they are able to find other suitable deposits and continue in business; in a growing number of cases no such deposits can be found; or those available are poor in quality or too costly to purchase, develop, and operate; or they are so far from major markets that shipping costs are prohibitive. Economic conditions have been such that many producers have been able to show a profit only because their existing deposits were purchased many years ago at prices which were extremely low compared to present values.

THE above should explain why every nonmetallic minerals producer should learn all the facts about, the reasons for, and the advantages of percentage depletion. He should work actively and continuously to sell percentage depletion to his congressmen, to his employees, his customers, and his community. Many are, of course, doing this now, but they are reaching only a small percentage of those who should be sold. Every senator and representative has an equal vote and each one should be contacted by as many people as possible. As time goes by, each new congressman should also be contacted because percentage depletion will probably always be vulnerable to attack.

Attend Your Industry's Convention!

JUST a few weeks away are some of the most important conventions of 1953 for several of the major nonmetallic minerals industries, including the agricultural limestone, crushed stone, and sand and gravel and the related ready-mixed concrete and concrete products industries. Details on the programs of most of these conventions are not yet available, but all producers of these materials and other interested persons can rest assured that the meetings will at least equal the high standards of previous years. Outstanding authorities from inside and outside these industries will discuss many subjects of vital importance, and there will be open forums and panel discussions. Well-balanced programs of entertainment have also been arranged for all those attending and for the ladies.

The conventions referred to, in the order of their occurrence, are those of the National Agricultural Limestone Institute, Statler Hotel, Washington, D. C., January 18-21, 1953; the National Concrete Masonry Association, Public Auditorium, Cleveland, Ohio, January 25-29, 1953; the National Crushed Stone Association, Hotel New Yorker, New York, February 2-4, 1953; the National Sand and Gravel Association and the National Ready Mixed Concrete Association, Fairmont Hotel, San Francisco, February 23-26, 1953.

THIS year only the National Concrete Masonry Association will hold a machinery exhibition along with its convention, but producers can be assured that at all these conventions machinery manufacturers will be well represented. In the meetings, and in discussions with these machinery manufacturers and with each other, producers can learn the answers to many of their operating and other problems.

The complete official program of the National Agricultural Limestone Institute convention is presented in the news section of this issue. The programs of the N. C. S. A. and the N. S. G. A. conventions will be published in the January Annual Review and Forecast Number of PIT AND QUARRY and those of the N. C. M. A. and the N. R. M. C. A. will be in the CONCRETE MANUFACTURER section of the January issue.

You can make no better investment of your time and money than by attending the convention of your industry. There is still time to make your hotel reservations if you act at once.

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CP Fiftieth ANNIVERSARY

news of the industry

PIT AND QUARRY

Harry A. Clark Elected Consumers Co. President To Succeed R. C. Reed

Harry A. Clark has been elected president of Consumers Company of Chicago, to succeed Robert C. Reed. Mr. Clark was also elected a member of the executive committee. At the same time Otto A. Cheska, vice-president in charge of Wisconsin operations, was elected a member of the board of directors and the executive committee.

Mr. Clark has been associated with Consumers Company for more than 30 years and has served successively as a salesman, pit and quarry sales manager, vice-president, executive vice-president, and director.

Mr. Reed has been a member of the board of directors since 1945 and president since 1950. Although he retires from active participation in the company's business, he will continue to serve as a member of the board of directors and as chairman of the executive committee.

Mr. Cheska, a veteran of the building materials industry, has been with the firm since 1931 in sales and operations, and in 1950 he was made a vice-president in charge of the company's Wisconsin operations.

Calaveras Wins Big Contract For Cement at Folsom Dam

Calaveras Cement Company has begun shipments on its 900,000-bbl. contract for construction of Folsom Dam, according to H. C. Maginn, executive vice-president and chairman of the management committee. The company, which already is supplying cement for Pine Flat Dam near Fresno, Calif., will continue to ship to Folsom through 1954.

Because of the recent expansion of its plant at San Andreas, Calaveras can fill its commitments to both dam projects while at the same time making full shipments to dealers and other customers, Mr. Maginn reported.

He added that new equipment at the Calaveras plant also has enabled the company to make refinements in the manufacture of its white portland cement. Calaveras is one of only four companies in the nation manufacturing white cement.

The Calaveras board of directors recently approved a five-year $500,000 loan from the Bank of America to cover added expansion at its San Andreas plant. Earlier in the year the company negotiated a $1,000,000 loan from the Bank of America for five years and a $1,200,000 loan from the Mutual Life Insurance Company of New York for 15 years.

Gulf Sulphur Co. of Delaware Announces 349-Ft. Strike

Gulf Sulphur Company of Delaware announced it had recently discovered what is claimed to be the world's deepest sulphur mantle. The new strike, made at Gulf's field located near San Cristobal, in the state of Veracruz, Mexico, was at a depth of 349 feet. The previous deepest sulphur well had been one in Texas at 175 feet. The firm also announced that plans have been made to sink 25 more wells in the San Cristobal area.

According to Mexican officials, this development is part of an important expansion program being undertaken by the sulphur industry in Mexico.

F. D. Coppock Honored At Ceremonies Opening $50,000 City Parkway

Citizens of Greeneville, Ohio, have a new $50,000 landscaped public square parkway, financed by the American Aggregates Corporation. The parkway was turned over to the city recently by William E. Hole, president of American Aggregates at ceremonies attended by Governor F. J. Lausche and Lowell Thomas, famed news commentator. Other notables present included Judge Charles B. Zimmerman of the Ohio Supreme Court; Congressman W. M. McCulloch of Piqua; Lieutenant Governor George Nye; and S. O. Linzell, Ohio highway director.

In presenting the landscaped area to the city, President Hole lauded the work of Fred D. Coppock, chairman of his company's board of directors, who "personally designed the layout of the square and the fountain which stands in its center." The square is the site of Greeneville's old city hall, which was razed at the expense of American Aggregates.

Coming Events

January 18-21, 1953—Washington. Annual convention, National Agricultural Limestone Institute, Inc. Hotel Statler.

January 25-29, 1953—Cleveland. 33rd annual convention and exhibit, National Concrete Masonry Association. Public Auditorium.

February 2-4, 1953—New York. 36th annual convention, National Crushed Stone Association. Hotel New Yorker.

February 16-19, 1953—Los Angeles. 175th general meeting, American Institute of Mining and Metallurgical Engineers. Hotel Statler.

February 23-26, 1953—San Francisco. 37th annual convention, National Sand and Gravel Association. Hotel Fairmont.

February 23-26, 1953—San Francisco. 23rd annual convention, National Ready Mixed Concrete Association. Hotel Fairmont.

February 25, 1953—Dallas. Fourth annual convention and meeting, American Concrete Pressure Pipe Association. Baker Hotel.

February 26, 1953—Dallas. Third annual convention and meeting, American Concrete Agricultural Pipe Association. Baker Hotel.

February 26-28, 1953 — Dallas. 45th annual convention and meeting, American Concrete Pipe Association. Baker Hotel.

March 4 and 5, 1953 — Des Moines. Eighth annual convention, Iowa Agricultural Limestone Association, Inc. Savery Hotel.

Air and Gas Institute Wins Award of Merit For 1952 from A.T.A.E.

One of the nation's highest honors recognizing the value of trade association services has been awarded Compressed Air and Gas Institute, the trade association of manufacturers of industrial air and gas compressors and compressed-air-powered tools and rock drills used by industry.

The honor referred to is the Award of Merit presented to the Institute in the 1952 A.T.A.E. Awards for Distinguished Service sponsored by American Trade Association Executives of Washington, D. C.

In the words of the citation, the Institute was presented the award "for its excellent services to its industry and especially for its education program centered on the schools of engineering throughout the United States and on the trade and technical press."

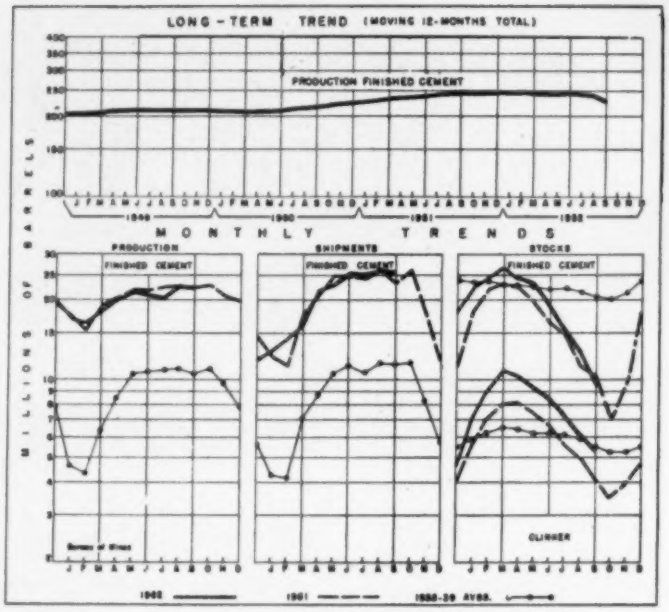
"During the past two years," the award citation continues, "these channels were used to vastly widen both professional and industrial understanding of thermodynamics.

"Many new uses of compressed air in mines, factories, and other fields were surveyed. Information on the cost-reducing advantages of the industry's product was widely and effectively disseminated through the use of such media as pamphlets, special articles in engineering journals and handbooks, films, lectures, and case-history surveys. These educational tools were valuable also to the salesmen and service men of the industry."

The Institute's award-winning public relations program was launched in 1941 and has consisted of approximately 50 case-history articles published annually in leading trade journals, the publication of *Compressed Air Handbook* in 1947, and a series of engineering teaching aids consisting of films, lectures, reference pamphlets, and surveys since 1947. The continuing program is developed by two committees of the Institute in collaboration with Edmond C. Powers, director of public relations of The Griswold-Eshleman Company of Cleveland, Ohio, who has served as educational director of the Institute since 1941.

The judges who selected the compressed air power program for award comprised: The Honorable Charles Sawyer, Secretary of Commerce of the United States, chairman; William J. Grede, president, National Association of Manufacturers; Dechard A. Hulcy, president, Chamber of Commerce of the United States; Edward H. Stromberg, Northwestern University; and Dr. Ray B. Westerfield, Yale University.

Members of Compressed Air and Gas Institute, which has offices in New York and Cleveland, include the following: Allis-Chalmers Mfg. Co., Milwaukee, Wis.; Buckeye Tools Corp., Dayton, Ohio; Bury Compressor Co., Erie, Pa.; Chicago Pneumatic Tool Co., New York, N. Y.; Clark Brothers Co., Inc., Olean, N. Y.; Cleco Division of Reed Roller Bit Co., Houston, Tex.; The Cooper-Bessemer Corp., Mount Vernon, Ohio; Davey Compressor Co., Kent, Ohio; DeLaval Steam Turbine Co., Trenton, N. J.; Elliott Company, Jeannette, Pa.; Fuller Company, Catasauqua, Pa.; Gardner-Denver Co., Quincy, Ill.; Independent Pneumatic Tool Co., Aurora, Ill.; Ingersoll-Rand Co., New York, N. Y.; Joy Mfg. Co., Pittsburgh, Pa.; Leroi Co., Milwaukee, Wis.; Nash Engineering Co., South Norwalk, Conn.; Pennsylvania Pump & Compressor Co., Easton, Pa.; Roots-Connersville Blower Corp., Connersville, Ind.; The Rotor Tool Co., Cleveland, Ohio; Schramm, Inc., West Chester, Pa.; Worthington Corporation, Harrison, N. J.



SUMMARY—Production of finished portland cement in September, 1952, as reported to the U. S. Bureau of Mines, totaled 23,010,000 barrels—a 3 percent increase over the September, 1951, figure. Mill shipments totaled 26,243,000 barrels—a 13 percent increase as compared to shipments in September, 1951, while stocks of 9,586,000 barrels of finished portland cement were 9 percent less than those of a year ago. Clinker production during the month totaled 22,135,000 barrels—2 percent more than in September, 1951.

PRODUCTION—One hundred and fifty-four (154) plants located in 37 states and Puerto Rico reported a production of 23,010,000 barrels of finished portland cement during the month, as compared to 154 plants which manufactured 22,269,000 barrels in September, 1951. Clinker production during the month totaled 22,135,000 barrels—2 percent more than was produced in September, 1951.

SHIPMENTS—Mill shipments of finished portland cement were 13 percent greater than in September, 1951, and totaled 26,243,000 barrels. Shipments were greater in 18 districts and lower in 1 district, as compared to shipments in September, 1951. The greatest increase in shipments was recorded for the Virginia-Georgia-Florida-Louisiana-South Carolina-Mississippi district, which gained 46 percent. Gains of 20 to 28 percent were made in four districts, including Texas, and four other districts, including California, showed increases ranging from 10 to 14 percent. The only district which reported lower shipments in September, 1952, than in September, 1951, was Puerto Rico.

STOCKS—Mill stocks of 9,586,000 barrels of finished portland cement were reported on September 30, 1952—9 percent less than on the same date one year ago, while stocks of clinker amounted to 5,177,000 barrels—25 percent greater than on September 30, 1951.

Wisconsin Lime Concern Adds Silos, Rotary Kiln

At the Rockwell Lime Company's plant near Manitowoc, Wis., where the first half of an expansion program has been completed, five new storage silos were recently put into service. Total capacity of the silos, under construction since January, 1951, is about 2,550 tons. Three of the structures are 50 ft. high, and the other two rise to 60 ft.

Other innovations recently installed include an intercone crusher, a self-feeder for carrying crushed lime to the silos, and a gas-fired rotary kiln.

Rockwell Lime Company, established in 1907, is owned and operated by Michael Brisch.

The Defense Minerals Exploration Administration recently announced the discovery of an important new sulphur deposit in Wyoming. The new source, which is expected to provide a considerable addition to domestic sulphur supplies, was discovered on the property of the Consolidated Sulphur & Phosphate Corporation in Park County.

R. A. Hummel Is Elected P.C.A. Board Chairman, Succeeding S. W. Storey

R. A. Hummel, chairman of the Lone Star Cement Corporation, New York, was elected chairman of the board of directors of the Portland Cement Association at its annual meeting in Chicago on November 10, 11, and 12. Mr. Hummel succeeds Smith W. Storey, president of the General Portland Cement Company and the Consolidated Cement Corporation of Chicago, who has served P.C.A. as chairman of the board for the last two years.

Four new directors were also elected. They include R. D. Raff, president, Diamond Portland Cement Co., Middle Branch, Ohio; Ellery Sedgwick Jr., president, Medusa Portland Cement Co., Cleveland, Ohio; Charles E. Shearer, president, Keystone Portland Cement Co., Philadelphia; and George E. Warren, president, Southwestern Portland Cement Co., Los Angeles.

The activities of the Portland Cement Association—a national organization to improve and extend the uses of portland cement and concrete — are limited to scientific research, development of new or improved products and methods, technical service, promotion and educational effort, and safety work. The association's varied services to cement users are made possible by the voluntary financial support of 69 member companies which produce a major portion of all the portland cement used in the United States and Canada.

Mr. Hummel has a distinguished background of service in P.C.A. activities. He was first elected to the association's board of directors in 1941 and has served continuously as a director to the present. He also served six times on the executive committee of the association. Mr. Hummel was elected chairman of the Lone Star Cement Corporation earlier this year after serving for almost 11 years as president of that organization. His home is in Larchmont, N.Y.

The retiring directors were E. E. Duque, president, California Portland Cement Co., Los Angeles; H. E. Harding, chairman of the board, Glens Falls Portland Cement Co., Glens Falls, N.Y.; and R. A. Wetzler, president, Whitehall Cement Manufacturing Co., Philadelphia. Mr. Sedgwick was elected to serve the remaining two years of the term of Harry L. Berno, late president and general manager, Medusa Portland Cement Co., Cleveland, who died last November.

Hubert C. Persons Authors Work on Portland Cement

A recent publication of special interest to our readers is entitled *The Portland Cement Industry*, a monograph prepared by Hubert C. Persons, manager of the public relations bureau of the Portland Cement Association, Chicago, Ill.

The work is one of a series of 75 occupational booklets to be used for job counseling. Among the topics discussed are the following: personal qualifications required; scholastic training needed; complete analysis of employment opportunities; remuneration; opportunities for advancement; advantages and disadvantages; and possibilities for men and women in the industry. It also contains basic information on all phases of the cement industry and the uses of cement.

Published by Bellman Publishing Company, Inc., P. O. Box 172, Cambridge 38, Mass.

Production at the Neal Gravel Co. plant, located near Covington, Ind., has been curtailed for about two months due to a recent fire which caused extensive damage in the crusher house. Equipment damaged or destroyed included several electric motors, conveyor belts, and screens. Damages amounted to an estimated $40,000.

R. A. Hummel

Cover Picture....

• Our December cover picture shows a scene at an elevation of approximately 8,000 ft. in which a Caterpillar D6 tractor teamed with a No. 6A Caterpillar bulldozer, is being used to build a setting pond at a fluorspar mine. The snow-capped mountains in the background are the Collegiate Peaks, near Poncha Springs, Colo. The pond, 15 ft. deep, is used in the production of fluorspar, which the Reynolds Mining Corporation at Alexander, Ark., utilizes in the manufacture of aluminum. Frozen earth, rock, stumps, and sometimes small trees are moved in the construction operations, frequently during sub-zero weather.

Lone Star Cement Co. Plans Big Expansion At New Maryneal Plant

Lone Star Cement Corporation has recently begun work on expanding the production capacity of its new installation at Maryneal, Tex., according to R. A. Hummel, chairman of the board. The plant's present capacity of 1,500,000 bbl. annually will be increased to 2,250,000 bbl. With completion of the proposed enlargement, the Maryneal plant will represent an investment of about $13,000,000.

Lone Star, which originated in Dallas in 1912 as the Texas Portland Cement Company, operates 12 cement plants in the United States and six in South America; its headquarters are in New York. The Maryneal plant, which was established in January, 1951, is being enlarged because of the huge demand of the construction and petroleum industries of Texas.

Phosphate Output Declines Sales Show Increase in 1952

Mine production of phosphate rock in the United States in 1951 (10,775,032 long tons) was approximately a third of a million tons less than the record high of 1950 (11,114,159 tons), according to reports submitted by producers of the U. S. Bureau of Mines. Decreases were shown in Florida and Tennessee; an increase of 9 percent was recorded, however, in the western states total. Total stocks in producers' hands decreased.

Sales increased, rising from 10,253,552 long tons in 1950 to 11,095,204 tons in 1951, a part of which came from stocks. Large increases in sales occurred in Florida and the western states, while those of Tennessee rock increased only slightly. The total value of the phosphate rock sold or used in 1951 rose to $66,158,078, a little more than $7,000,000 above the 1950 level. The P_2O_5 content of the rock sold or used in 1951 increased to 3,569,651 long tons from 3,336,112 tons in 1950. This is a new record high. The upward trend in the marketed production of Florida phosphate rock continued in 1951, reaching a total of 8,496,831 long tons.

By far the greatest part of the production came from the land-pebble field, with relatively small quantities of hard rock and soft rock (waste-pond phosphates from the hard-rock field) being produced. The sales of the latter kind were somewhat larger than those of the hard-rock phosphate.

Tennessee remains the second-largest phosphate-rock-producing state. The total marketed production of the western states rose from 783,209 long tons in 1950 to 1,178,481 tons in 1951. Phosphate rock was produced and sold in all four states of the western field in 1951—Idaho, Montana, Utah, and Wyoming. Idaho led in sales, with Montana second, and Wyoming third.

Imports increased both in quantity and value in 1951. Exports in 1951, as reported by producers to the Bureau of Mines, were below 1950 in quantity, but above in value. Apparent domestic consumption of phosphate rock rose to a record high of 9,507,951 long tons.

● Three Calaveras Cement Company employees were honored recently for the completion of 25 years in the service of the firm. Participating in the presentation of inscribed gold watches were E. M. Barker, plant manager; Marion Heard, assistant plant manager; H. C. Maginn, vice-president and chairman of the Calaveras' management committee; William H. Schwoerer, oilhouse attendant; and Raymond L. Cuneo, labor foreman. The honorees were Mr. Heard, Mr. Schwoerer, and Mr. Cuneo.

A.S.T.M. Committee Reports Many Actions on Standards

The Fall meeting of the Administrative Committee on Standards always is an important one since it provides an opportunity for many of the technical committees to request approval of new and revised specifications and tests in time for inclusion in the various books to appear during the year. This year the meeting on September 5 was particularly significant, with a greater number of actions submitted than ever before. This was largely because of the pending publication of the 1952 Book of ASTM Standards in its new seven-part division.

The following article, arranged according to the fields covered, highlights some of the important new tentatives and revisions. All of these new and revised specifications will appear in the 1952 Book of ASTM Standards.

Cement—Standard Specifications for Masonry Cement (C 91) cover two types of cement, with different strength requirements. Tentative revisions have been approved which will insure accurate and appropriate identification of the type.

Committee C-1 also recommended several revisions in Tentative Specifications for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Portland Cement (C 226). These were worked out jointly with Committee C-9 on Concrete and Concrete Aggregates. The results of this cooperative study, a joint statement of policy and explanation of the ASTM procedure in the consideration of air-entraining additions, appeared on page 24 of the September ASTM Bulletin.

Lime and Gypsum—Submitted jointly by Committee C-7 on Lime and Committee C-11 on Gypsum are Tentative Specifications for Inorganic Aggregates for Use in Interior Plaster to replace existing Specifications for Sand for Use in Plaster (C 35). These Specification outline limitations for those aggregates most commonly used in interior plaster, including perlite, sand (natural and manufactured), and vermiculite.

Mortars for Unit Masonry—In the proposed revision of Tentative Specifications for Mortar for Unit Masonry (C 270), Committee C-12 has complied with requests to include a portland cement-masonry cement mixture in these Specifications. This addition has been made to Table II, which gives mortar proportions by volume.

Manufactured Masonry Units—Revision of Tentative Specifications for Chemical-Resistant Masonry Units (C 279) was proposed to employ the use of the terms "H" and "L" to denote high absorption and low absorption respectively. The committee felt that these terms are more descriptive in a concise way than the terms "Standard" and "Minimum Absorption".

Baker Attends Ceremonies Honoring Ordnance Plant

Melvin H. Baker, chairman of the National Gypsum Company's board of directors, recently attended ceremonies at the firm's facilities at Wahoo, Nebr. (now operated as the Nebraska Ordnance Plant), marking the presentation of the U. S. Treasury Department flag and a citation from A. W. Overby, assistant secretary of the Treasury.

Mr. Baker, who was president of National Gypsum for 26 years before becoming chairman of the board, flew to Wahoo in the company's plane, *Gold Bond*. He was accompanied by Frank Davis, National Gypsum director of industrial relations.

The Zonolite Company, Chicago, has opened a vermiculite processing plant at Wilder, Ky., according to word received from the company's territorial manager. The new plant will process vermiculite ore from mines located at Libby, Mont., and Travelers, S. C. The installation brings to 37 the number of Zonolite processing plants in the United States and Canada.

Marquette Reveals Plans To Spend $2,250,000 On Plant Modernization

Marquette Cement Manufacturing Company has announced that during 1953 the company will spend more than $2,250,000 on major improvements at five plants. Involved will be capacity increases effected at its Cape Girardeau, Mo., and Cowan, Tenn., producing plants. Three new, thoroughly modern packing plants will be built at St. Louis, Memphis, and Nashville to replace old and obsolete facilities at each of those locations. Cement storage capacity at the company's Memphis shipping plant will be doubled. Also included in the program are appropriations for a new dock at St. Louis, for additional stripping and other equipment at several quarries, and for numerous smaller improvements at all Marquette plants.

At Cape Girardeau, annual clinker producing capacity will be increased an estimated 100,000 barrels by the installation of equipment designed to improve rock crushing and kiln burning efficiency. These improvements will raise the producing capacity of the Cape plant to about 1,500,000 barrels of clinker annually. The work is expected to be completed by the warm weather months of peak demand next year.

Similarly, kiln efficiency at the Marquette plant in Cowan, Tenn., will be improved with new equipment which will increase clinker producing capacity there by at least 50,000 barrels, bringing the annual capacity of this plant up to very nearly 1,000,000 barrels. This improvement work also is expected to be completed next Spring.

More than a half million dollars will be spent on thorough modernization of Marquette's St. Louis shipping plant. The completely new packing and loading facilities will improve working conditions, operating efficiency and service to customers in the area served by this plant. In the process of modernization, the plant's cement transfer dock on the Mississippi River will be replaced with a new permanent dock and captive barge arrangement, on which will be installed all machinery for the transfer of cement from river barges to storage silos. Progress of this work will be scheduled so as not to interfere with continuity of operations there.

Packing and loading facilities at the company's Memphis shipping plant will be modernized to the same extent as at St. Louis, but at Memphis four additional storage silos, each of 10,000-barrel capacity, will also be erected. Company officials state that this added storage capacity will increase the efficiency of barge movements of cement from the Cape Girardeau plant, ease the storage problem at Cape Girardeau during the cold weather months of light demand, reduce the expense of storing and reclaiming clinker, and make more cement available to Marquette customers in the Memphis sales area.

The new packing plant for Nashville, as at St. Louis and Memphis, will include the latest facilities for cleaner and more rapid packing and loading of all types of cement for both bulk and bag shipment.

Azusa Rock & Sand Co. For Outstanding Record Wins Safe Driving Trophy

While Harry Bender, president and general manager of the Azusa Rock & Sand Company, Azusa, Calif., was in Swampscott, Mass., recently to attend the board of directors' meeting of the National Sand & Gravel Association, he missed out on a signal honor to his company.

This was the award of the perpetual sweepstakes trophy for having the best operating-fleet safety program among the 155 participants in the eighth annual contest conducted by the Greater Los Angeles Chapter, National Safety Council.

A. J. Wise, assistant general manager, accepted the gold trophy in President Bender's absence at the Award Banquet held on September 25, 1952, at the Los Angeles Breakfast Club, while 80 employees of the Azusa Rock & Sand Co. and the rest of the crowd in attendance applauded the achievement.

The overall accident-frequency rate of 3.50 for the entire group of participants was the lowest in the history of the Los Angeles Area contests, the 155 companies, with a total of 21,901 vehicles, having driven a grand total of 377,875,329 miles during the contest period.

While the Azusa firm carried off the top honors, six of the participating companies had perfect records during the year. After an evaluation of the contest reports had narrowed the field, the Award Committee visited these plants to see the individual safety programs in action. Among the factors considered were these: designation of a fleet safety supervisor; driver testing program; preventive maintenance schedule; accident record and analysis system; improvement in record; and physical condition of plant garage.

Plaque winners in the Construction-and-Building Division also included the United Concrete Pipe Corporation, which had a perfect record, and the Southwestern Portland Cement Company, Los Angeles.

Solvay Divisions Merged, Main Sales Offices Moved

According to a recent announcement, The Solvay Sales Division and The Solvay Process Division will be consolidated and known as The Solvay Process Division, Allied Chemical & Dye Corporation, effective June 1.

On June 9 the executive sales offices were removed from 50 Rector Street to 61 Broadway, New York 6, N.Y.

California Producers Pay Increases at Five Plants

Hourly wage and holiday pay rate increases were approved by a regional Wage Stabilization Board for engineers, equipment operators, maintenance men, truck drivers, and laborers in the principal rock and sand-and-gravel operations of northern Santa Barbara and San Luis Obispo counties of California. Companies involved include the Southern Pacific Milling Company and H. G. Iliff & Son, both of Santa Maria; Petersen Buell Flat Rock, of Solvang; Walter B. Roselip, San Luis Obispo; and the Lompoc Truck Co., Inc., Lompoc.

• A. J. Wise (left), assistant general manager, Azusa Rock and Sand Company, accepts the Sweepstakes Trophy for the best fleet safety record in the annual contest sponsored by the Greater Los Angeles Chapter, National Safety Council.

Southern Pacific Milling, Petersen Buell, and Roselip managements were permitted to pay an average increase of 11¾ cents per hour to engineers and equipment and maintenance personnel affected by the decision. All five employers were allowed to grant wage increases ranging from 9 to 40 cents per hour to workers in various types of jobs.

August Lime Report Shows Highest Sales During 1952

Domestic sales of open-market lime were 691,948 short tons during the month of August, the highest during the year, according to reports of producers to the U. S. Bureau of Mines. Sales of dead-burned dolomite increased threefold in August due to the cessation of the steel strike, which adversely affected sales in June and July.

The table below shows sales by types and major uses.

$575,000,000 Apportioned For Federal-Aid Highways By Act of Congress

Apportionment of the $575,000,000 authorized as Federal aid to the states for highways in the fiscal year beginning July 1, 1953, has been announced by Secretary of Commerce Charles Sawyer. The funds were authorized by the Federal-aid Highway Act approved June 25, 1952.

The Act provides $247,500,000 for projects on the Federal-aid primary highway system, $165,000,000 for projects on the Federal-aid Secondary system, $137,500,000 for projects on the Federal-aid primary highway system in urban areas, and $25,000,000 for projects on the National System of Interstate Highways. This is the first time that funds have been provided specifically for the Interstate System.

Funds will be expended under the supervision of the Department's Bureau of Public Roads and according to the general procedure in use for many years in which State highway departments propose projects, prepare plans, award contracts, and supervise construction, all subject to federal approval. Federal participation is limited to half the cost except in the public-lands states, where participation may be increased above 50 percent by one-half of the percentage of the area of the state that is public land.

Funds for the Federal-aid primary highway system are apportioned in proportion to area, population, and mileage of post roads, each being given equal weight. Funds for Federal-aid secondary roads are apportioned in the same manner except that rural population is used rather than total population. Funds for urban projects are apportioned in proportion to population in municipalities and other urban places of 5,000 or more. Funds for the Interstate System are apportioned in the same manner as those for the Federal-aid primary highway system.

The funds apportioned will be available for expenditure until June 30, 1956.

Lime Sold by Producers[1] in the United States, January-June, July, and August, 1952, by Types and Major Uses, in Short Tons

	January-June 1952	July 1952	August 1952
By types:			
Quicklime	2,869,624	328,448	533,017
Hydrated lime	934,441	144,117	158,931
Total lime[2]	3,804,065	472,565	691,948
By uses:			
Agricultural:			
Quicklime	28,537	3,009	7,079
Hydrated lime	122,591	9,742	13,140
Total	151,128	12,751	20,219
Building:			
Quicklime	102,462	19,229	19,558
Hydrated lime	452,864	82,523	86,145
Total	555,326	101,752	105,703
Chemical and other industrial:			
Quicklime	1,843,292	247,192	329,669
Hydrated lime	358,986	51,852	59,646
Total	2,202,278	299,044	389,315
Refractory (dead-burned dolomite)	895,333	59,018	176,711

[1] Also includes a small quantity of captive tonnage (6-7 percent of the total reported herein) to maintain comparability with the annual lime statistics.
[2] Approximately 60 percent of lime produced is high calcium and 40 percent high magnesium.

Convention Program

Hotel Statler, Washington, D. C.

National Agricultural Limestone Institute
January 19-21, 1953

MONDAY, JANUARY 19

MORNING SESSION—9 a.m.
FEDERAL ROOM

Presiding—President Robert M. Patton
Registration—Foyer of Federal Room
Movie, "The Good Earth for a Better Life"
Call to order and welcome by president
Reading of minutes of previous meeting
Treasurer's report—Verne C. Morgan
Report of committee chairmen
- Audit and Finance—C. A. Munz
- Membership—R. M. Patton
- Legislative—H. C. Gray
- Percentage Depletion—H. C. Krause
- Promotion—W. E. Stone

Executive secretary's report—Robert M. Koch
Old business
New business
12 m.—Adjournment, followed by five regional meetings to nominate directors and regional vice-presidents. (Region I—States east of II and III and Canada; Region II—Kentucky, Indiana, Michigan, Ohio; Region III—Alabama, Arkansas, Louisiana, Mississippi, Missouri, Tennessee; Region IV—Illinois, Minnesota, Wisconsin; Region V—States west of III and IV and Mexico)

GREETING LUNCHEON—12:30 p.m.
CONGRESSIONAL ROOM

Presiding—Director Russell W. Hunt
"How Confused Can You Get?"—Address by Edward McFaul

AFTERNOON SESSION—2:30 p.m.
FEDERAL ROOM

Presiding—Vice-President K. K. Kinsey
"Agricultural Limestone in the Grassland Economy"—Address by R. Willis Stout, soil editor of the "Kentucky Farmer"

EVENING PROGRAM—6 p.m.
Cocktails
Buffet
Dancing

TUESDAY, JANUARY 20

MORNING SESSION—9:30 a.m.
FEDERAL ROOM

Panel on Operations
Chairman—Leo Davis
Participants—M. R. Ackland, George W. Mintz, and Rollie Schneckloth
12 m.—Inauguration ceremonies, beginning at the Capitol, may be seen over television in the Federal Room, ladies' suite, and Institute suite.

AFTERNOON SESSION—2:30 p.m.
FEDERAL ROOM

Panel on Operations (continued)
5:30 p.m.—Open house—Institute suite

WEDNESDAY, JANUARY 21

MORNING SESSION—FEDERAL ROOM
9 a.m.—Movie, "Grasslands Farming"
9:30 a.m.—Panel on promotion—This discussion will be led by the Promotion Committee. Chairman William E. Stone, assisted by the other two members, Leonard Fry and Robert Pleasant.
Topics: Billboard advertising, direct mail, newspapers, news releases, and radio advertising

LUNCHEON—12:30 p.m.
CONGRESSIONAL ROOM

Presiding—Director Charles Coburn
"Agricultural Production Job"—Address by Gus Geissler, Administrator of Production and Marketing Administration, USDA

AFTERNOON SESSION—2:30 p.m.
FEDERAL ROOM

Presiding—Director William D. Dillon
"Closing the Gap—Lime Use and Needs"—Address by W. A. Minor, Assistant to the Secretary of Agriculture
"Percentage Depletion"
4:30 p.m.—Adjournment

EVENING SESSION—6 p.m.
RECEPTION FOR MEMBERS AND GUESTS
CONGRESSIONAL ROOM
ANNUAL BANQUET—7 p.m.
PRESIDENTIAL ROOM

"National Defense in Our Soil"—Address by Senator Wayne Morse

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Portland Cement Association Opens 27th District Office

The Portland Cement Association has opened a new district office in Helena, Mont., with Jack Y. Barnes, formerly field engineer with the Association's Des Moines office, as district engineer in charge. The new office is located in Rooms 9-10, Gold Block, Helena, and will carry on the P.C.A.'s educational work, technical service, and local promotion activities throughout Montana.

The new district office is the 27th to be established by the Association in principal cities of the United States and Canada. It will provide Montana cement users with service and information not previously available to them, including the Association's storehouse of educational literature and technical information, covering every field of cement use and made possible by the voluntary financial support of Association member companies.

Jack Y. Barnes, the new district engineer in Montana, joined the Association in 1937 as office engineer with the Des Moines office. In 1940 he was appointed field engineer for northwest Iowa with headquarters in Mason City, the post he held at the time of his promotion to district engineer.

A graduate of Iowa State College, with a B.S. degree in civil engineering, Mr. Barnes was employed for three years by the U. S. Soil Conservation Service before joining the Association. He also served for three years in a Navy Construction Battalion during World War II, including a 21-month tour of duty in the South Pacific. He was released from active duty in 1945 and now holds the rank of Lieutenant Commander in the U. S. Naval Reserve.

A registered professional engineer in Iowa, Mr. Barnes has been active in a number of professional organizations in that state. During 1951, he served as director and member of the executive committee of the Iowa Engineering Society and in 1952 was elected president of the Iowa Section of the American Society of Civil Engineers.

Jack Y. Barnes

Manitowoc Again Producing After Major Repair Job

Full production at the Manitowoc Portland Cement Company, Manitowoc, Wis., was resumed recently after a shutdown due to the collapse of girders over grinding machinery. No one was injured, as the breakdown occurred during the noon hour.

Repair crews worked around the clock, and the plant returned to partial production within a few days. Due to the shutdown, numerous state highway jobs and other building projects throughout the state were held up temporarily.

Dallas Lightweight Aggregates Builds $500,000 Haydite Plant

The Dallas Lightweight Aggregate Company, an affiliate of Texas Industries, is constructing a new $500,000 lightweight aggregate plant near Dallas, which will begin production in December. The plant, containing three kilns, will produce haydite, utilizing shale obtained from a recently acquired 125-acre pit nearby.

The bulk of the haydite will be used by The Texcrete Companies, another affiliate of Texas Industries, which operates a large-scale lightweight concrete block plant on property adjoining the new haydite plant.

R. S. Roeller, Sales Manager Of Pennsylvania Salt Co. Dies After Brief Illness

Russell S. Roeller, general sales manager of the Pennsylvania Salt Manufacturing Company, died on November 12 after a brief illness in the Phoenixville, Pa., hospital. He was 60 years old.

Mr. Roeller had been honored only a few days earlier for his 30 years of service with Pennsalt at a luncheon with company executives. One of the best-known figures in the industry, Mr. Roeller had established a nation-wide acquaintance throughout all industries using chemical commodities.

Mr. Roeller joined Pennsalt as a salesman in 1922, after previous sales and industrial experience which included two years as an employee of British Ordnance prior to the United States entry into World War I. He was appointed Pennsalt's Philadelphia District sales manager in 1933 and became field sales manager in 1942. He assumed additional administrative duties with his appointment as assistant general sales manager in 1950 and soon thereafter was named general sales manager.

Long active in chemical trade organizations, Mr. Roeller was a member of the Board of Directors of the Chlorine Institute and of the National Production Authority's Alkali-Chlorine Committee. During World War II he served as a member of the Army-Navy Munitions Board Advisory Committee.

Expansion Projects Planned For Turkish Cement Industry

According to a report recently received, Turkish cement production is averaging 400,000 tons per year. This figure, nevertheless, is not sufficient to meet domestic demands. Last year Turkey imported an additional 250,000 tons.

Plans call for doubling of the Sivas cement factory. The present capacity of the plant, which is 90,000 tons per year, will be increased to 140,000 tons by the end of 1952 and to 180,000 tons in 1953. Among other contemplated measures is the construction of a new cement works at Izmir, which will begin production toward the end of 1953. This operation will supply the local market with 150,000 tons of cement per year.

Permanente Cement Plant Wins Local Safety Award

Accent on safety paid off for employees of the Permanente Cement Company, Oakland, Calif., who recently won an award in the industrial section of the safety contest sponsored by the East Bay Chapter of the National Safety Council.

Symbolizing a perfect safety record from July through December, 1951, the award was presented to Ken Ryder, foreman, at a banquet given in Oakland. Other Permanente plant staff members present at the ceremony included A. C. Miller, operations superintendent; L. R. Flicker, safety director; Carl Stibolt, public relations manager; Pete Hass, assistant works manager; John Ames, assistant safety supervisor; and Robert Nieman, assistant operations superintendent.

• Mr. Stevens rams his loader into a gravel bank at high-speed reverse, but the cutting edge of the bucket takes to the rough treatment.

Big Pit Grows Down and Out Aided by Modern Equipment

Back in 1914 Walter Stevens helped his father dig a fence post hole on the farm at Gorham, Me. Now, 38 years later, he is still digging at the same hole, which is a mighty big one in the Maine countryside, 16 miles west of Portland. Meanwhile the digging has grown into the H. H. Stevens Sand and Gravel Company.

There are different ways of doing the shoveling now, which is no longer tackled by hand. The pit, about 100 ft. deep and 600 ft. across, yields its yardages of material to mechanized units, such as an Oliver Industrial "77" wheel tractor mounting a Strait-Line hydraulic loader built by Maine Steel, Inc., South Portland, Me.

Mr. Stevens considers his loader a good investment, and reports extraordinary service records for the bucket blades of Jalloy (Jones & Laughlin) he has used. He estimated that during two and a half years of life the first cutting edge helped load at least 40,000 cu. yd. of sand and gravel under the roughest kind of impact and abrasion.

New Records Established In 1951 by Perlite Industry

Virtually unknown on a commercial basis prior to World War II, expanded perlite in 1951 attained a production total 33 times greater than in 1946. Total output of expanded perlite in 1951 reached 134,479 short tons, and the quantity of expanded perlite sold or used was 133,175 short tons, valued at $7,243,298. The quantity of crude rock sold or used by producers was 181,588 short tons, valued at $809,971. The difference between the quantity of crude sold (or used at the plant) and the quantity of expanded material sold is accounted for by losses in transit, unexpandable material in the furnace feed, unsalable fines produced, stocks in transit or in storage, and the loss of moisture weight during furnacing.

In 1951 active mines were located in seven western states, with deposits in Nevada, New Mexico, and Colorado furnishing 87 percent of the total requirements of crude rock.

In 1951 perlite processing plants were located in 27 states throughout the United States. California led in number of plants with 11, followed by Illinois and Texas with 5 each, and Pennsylvania and Utah with 4 each. One or two plants were located in each of 22 other states. Some 10 or 12 additional plants are reported to be under construction. The greatest quantity of expanded perlite was produced and sold by firms in California, while large quantities were also produced and sold in Pennsylvania, Illinois, New Jersey, Oregon, Ohio, and Texas.

The average value of expanded perlite in 1951 was $54.39 per short ton—slightly lower than the $54.52 per short ton shown for 1950. In general, the average value increased in the western states and declined in the eastern states.

A Lady Has a Birthday— 25 and Still Going Strong

In the August issue of the *Lone Star Safety News* (New Orleans edition) a tribute appeared "to a grand old lady", the company's tug, *Lone Star*, which had served the firm for 25 years.

According to the reporter the *Lone Star* during this quarter-century made approximately 2,000 trips between New Orleans and Mobile without a serious accident.

The Carolina Giant Cement Company has obtained a $30,000 building permit from city officials at Columbia, S. C., for an office building. The structure will have 2,900 square feet of floor space.

The Arizona Sand and Rock Company of Phoenix, Ariz., has put into service three new Euclid 86FD trucks, having a 12 cu. yd. quarry-type body, on the $398,402 U. S. 66 highway construction project between Williams and Ash Fork, Ariz.

P.C.A. Wins Top Award Of National Safety Council For Service to Industry

A voluntary, humanitarian approach to safety has made the accident prevention work of the Portland Cement Association "the nation's Number One association safety program," according to Ned H. Dearborn, president of the National Safety Council. Mr. Dearborn's remarks were made in presenting an honor award to the P.C.A. "for outstanding service to industrial safety" at the Association's annual meeting in Chicago on November 12.

The award was accepted by John W. Mather, chairman of the Association's Accident Prevention Committee. Mr. Mather pointed out that the cement industry was cited by the National Safety Council as being the safest of all heavy industries in 1951, and that current figures show accidents have continued to decline in 1952.

Much credit for this steady and rapid progress in cement industry safety should go to the accident prevention work of the Portland Cement Association, according to Mr. Dearborn. "The Association should take great pride," he said, "in the fact that its accident prevention program was started more than a third of a century ago and has steadily expanded to a position of the highest national prominence."

• Ned H. Dearborn, president, National Safety Council (right), presents the safety award to John W. Mather.

The rate of occupational injuries in the plants of member companies of the Portland Cement Association has been reduced 87 percent in the past 28 years. During this period it is estimated that more than 2,000 lives have been saved, 2,700 permanently disabling injuries averted, and over 100,000 other lost-time injuries prevented as a result of Association-sponsored safety programs.

Basic Refractories Film Issued by Kaiser Aluminum

The Chemical Division of Kaiser Aluminum & Chemical Sales, Inc., has released the first comprehensive industrial motion picture in color showing the manufacture of basic refractories.

The 30-minute, 16 mm. sound film, entitled *Bricks from the Sea*, follows the company's refractory brick and ramming mix production from the extraction of magnesia from the Pacific Ocean by processing 13,000,000 gallons of seawater daily to the use of refractories in the production of steel, cement, copper and basic products. The company's three plants devoted to the production of refractories are located at Natividad and Moss Landing, Calif.

The motion picture is available for showing through Frank M. Cashin, general sales manager, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif.

Mexican Promoters Awarded Island Sulphur Mining Rights

One of the world's largest volcanic sulphur deposits, located on an island off the northwestern coast of Mexico, soon will be exploited, according to an announcement issued Gen. A. Morales Salas and Joseph Wekstein, both Mexican citizens.

The two backers of the venture have secured a concession from the Mexican government for rights on uninhabited Socorro Island, 369 miles off the coast. American and Mexican geological groups had estimated the deposit at 800,000 tons or more, with sulphur of about 95 percent purity.

Under the terms of the concession General Salas and Mr. Wekstein will mine and process the material for an indefinite period. It was indicated that the two partners would invest $827,000 in the project. They expect to attain a capacity of 200 tons of refined sulphur daily within the next year.

1951 Asphalt Sales Total Up 11 Percent Over 1950

Recorded domestic sales of asphalt by petroleum refineries were 11 percent larger in 1951 than in 1950; and total indicated demand, domestic and foreign, for petroleum asphalt was 13 percent higher in 1951 than in 1950, according to the U. S. Bureau of Mines. Because of greater demand, petroleum refineries enlarged their output 14 percent; and imports of petroleum asphalt, lake asphalt, and grahamite were increased 36 percent. These imports, however, made up less than 4 percent of the total new supply available during 1951.

Stocks of asphalt held at the refineries increased 25 percent during 1951, as compared with an 8 percent increase during 1950.

East Tennessee Formations Shown in New Geologic Maps

The Tennessee Department of Conservation, Division of Geology, Nashville, Tenn., announces the impending release of a group of geologic maps covering all of east Tennessee. There are 14 maps in the group, showing the various rock formations of eastern Tennessee in bands of contrasting color. An accompanying sheet of cross-sections shows the structural details of the rock formations.

These maps were compiled by John Rodgers of the U. S. Geological Survey as part of the cooperative ground-water program of the Survey and the State Division of Geology.

Work on Rare Earths Reported in New Bulletin Issued by Mines Bureau

Experiments to develop methods of concentrating ores that could supply a substantial amount of the rare earths required by the United States for years to come are described in a report released today by J. J. Forbes, director of the U. S. Bureau of Mines.

The search for new domestic sources of rare-earth minerals has resulted in discoveries of large deposits of bastnaesite, a fluocarbonate of the rare earths, in California and New Mexico. If efficient methods of concentration can be developed, these deposits should supply much of our needs of all rare-earth minerals except thorium for more than 70 years, according to current estimates.

Pioneering in metallurgical investigations to establish concentration methods, the Bureau of Mines tested bastnaesite ores from Mountain Pass, San Bernardino County, Calif., and fluorspar ores containing bastnaesite treated by the Zuni Milling Co., near Albuquerque, N. M. The Bureau's present report contains results of the tests and detailed descriptions of the procedures followed.

The Bureau's report was prepared by J. B. Zadra, chief, Hydrometallurgical and Ore-Dressing Branch, Metallurgical Division, Region III; A. L. Engel, metallurgist; and E. S. Shedd, chemical engineer, all of the Bureau's Reno, Nev., station. Besides describing the tests and tabulating their results, it gives analytical methods for the determination of cerium, thorium, other rare earths, and barium in bastnaesite ores.

A free copy of Report of Investigations 4919, *Concentration of Bastnaesite and Other Cerium Ores*, may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa. It should be identified by number and title.

Canadian Concern Records "Best Year" of Its History

The annual statement of Standard Paving and Materials Ltd., Toronto, Ont., Canada released recently discloses the best year in the company's history, with a 14 percent increase in business and a 23 percent profit increase.

Records showed a net profit of $2.43 per common share, as against $1.91 per share last year. A large part of the $893,898 capital expenditure was for a new sand-and-gravel aggregate plant at Paris, Ont.

According to recent reports from Jerusalem, an overhead conveyor belt or cable car system will be built 3,000 ft. out into the sea from the Israeli coast in the Ascalon area within the next year to load phosphates and potash for export directly into ocean-going freighters. This arrangement will eliminate expensive transport to the Haifa harbor; it will permit Israeli phosphates to compete on world markets and will make potash export more profitable.

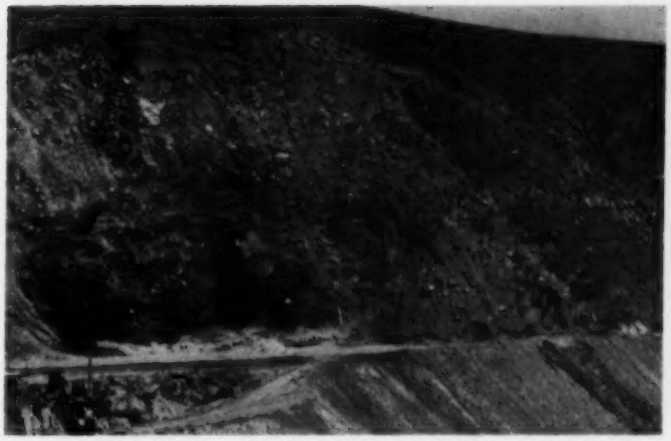
1,000,000 Tons of Stone Brought down by 3M In "Biggest Ever" Blast

About four years ago the Minnesota Mining and Manufacturing Company built a new, modern plant at Corona, Calif., for the manufacture of roofing granules to supply the western building material market. The location selected was the site of an old quarry which had been developed many years earlier in an extensive deposit of dacite porphyry. This material is ideally suited for the production of roofing granules and makes an excellent product.

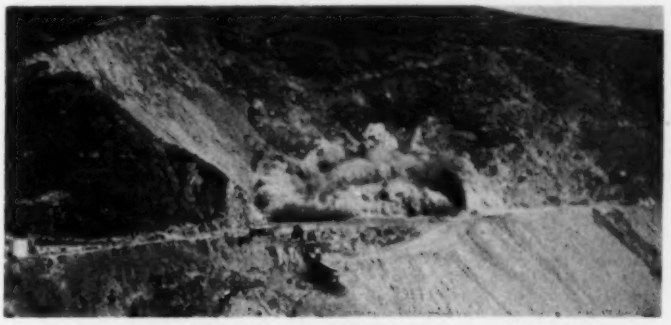
Since the new plant was opened, the Du Pont Company has collaborated with 3M almost continuously in connection with the primary blasting of their raw material. This formation lends itself readily to application of the coyote method, and several fairly large shots have been made during this period.

However, the largest one was made this year on July 26, setting a record for the size of commercial blasts on the West Coast. It contained 372,298 pounds of the Du Pont Company's blasting agent "Nitramon" and produced a tonnage of material which has been estimated at 1,000,000 to 1,500,000 of broken stone. The coyote layout contained upwards of 1,000 feet of tunnel.

In this type of shooting, the "Nitramon" cans are stacked as required and according to a detailed plan, in small tunnels or coyotes driven into the quarry bank. For added efficiency, regular power lighting can be used, and there are no electric blasting caps in the tunnels which might be set off by a stray current or by lightning storms.



• Photograph taken during the quarry blast at 3M's Corona, Calif., operation.



• Later during the blast, the largest commercial detonation on record in the West.

• After the blast—between 1,000,000 and 1,500,000 tons of broken stone brought down on July 26, 1952.

Jan.-Mar. Bauxite Output Largest in Last 7 Years

Domestic mine production of bauxite in the final quarter of 1951 reached a post-war record total of 519,062 long tons (dried equivalent), according to the Bureau of Mines. Output for the year was 1,864,076 tons, the greatest in seven years, and approximately 40 percent more than in 1950. Arkansas produced 98 percent of the domestic bauxite during 1951.

Imports of bauxite declined slightly in the fourth quarter of 1951, but the annual total was the greatest in history. Of the total receipts from British Guiana in 1951, 18,642 long tons were calcined bauxite imported under the new tariff provision for refractory-grade ore. All of the exports during the fourth quarter were shipped to Canada.

A.S.T.M. Announces Booklet On Cement Studies, 1904-50

A newly-issued publication of the American Society for Testing Materials, *Changes in Characteristics of Portland Cement as Exhibited by Laboratory Tests over the Period 1904 to 1950*, prepared by H. F. Gonnerman and William Lerch, is now available as A.S.T.M. Special Technical Publication No. 127.

Part I describes the changes in composition, fineness, and strength-producing characteristics of Type I portland cement, as exhibited by laboratory tests. Part II includes composition, fineness, strength-producing characteristics, volume change, heat of hydration, and sulphate resistance of the five types of portland cement covered by A.S.T.M. Specification C150.

Copies of the 56-page booklet may be procured from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., at $1 each.

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE December, 1922, issue of PIT AND QUARRY contained no outstanding articles but presented a wealth of timely information on subjects of interest to producers. One article told of the advantages of winter drilling and blasting in quarries to build up reserves of stone for the busy operating season. This was held to be especially advantageous for large operations or in any quarries where deep holes were required or where the rock was extremely hard and drilling slow. Advice was also given on methods of providing winter storage capacity without going to expense which could be justified only for permanent storage systems. Many operators, according to another article, keep at least part of their employees busy during the winter by making plant repairs, improvements, expansions, etc. Few, however, ever think to take some of this time to paint their plants, a procedure which would not only prolong its life but would also improve the morale of employees and make a favorable impression on customers and the community in general.

Operators were advised to engage the services of experts before making any major changes, building new plants or making any sizable expenditures as expert advice can often prevent them from making very expensive errors. The use of various types of cars in pits and quarries was discussed, with information on the advantages of certain types under different conditions. The advantages of power shovels and their application under varying conditions was pointed out in another article which also described the use of hand shovels for such work.

A feature article was on *Stripping Problems in Limestone Quarries of Shenandoah Valley*, by Oliver Bowles, then mineral technologist, U. S. Bureau of Mines. *Profit in Sand for Polishing* was the subject of Alfred B. Searle, consulting technologist. *Waste in Boiler Operation* also gave much valuable information.

Plant operating articles included a complete description of the new sand-and-gravel plant of the Guaranteed Gravel & Sand Company near Mankato, Minn. The gypsum mine and crushing plant of the Phoenix Gypsum Company at Oakfield, N. Y., was also described.

There was a complete program of the convention of the National Crushed Stone Association to be held in Chicago, January 15-17, 1923. A wide range of important subjects were to be discussed. At a special meeting of members of the National Association of Sand & Gravel Producers a new constitution was adopted which changed the name to the National Sand & Gravel Association. The date of the annual convention was set at January 24-26, 1923, probably either in St. Louis or Washington.

An outstanding news item in that issue told of the increase of its capitalization to half a million dollars by the McGrath Sand & Gravel Company and plans for the construction of a new plant at Joliet, Ill. The completion of the new lime plant of the San Bernardino Valley Lime & Rock Company, at Colton, Calif., was also announced. This plant had two kilns of 200-bbl. daily capacity each. The Lehigh Portland Cement Company announced the awarding of a contract for the construction of a new 1,000,000-bbl. cement plant at Tarrant City., Ala., at a cost of $2,500,000. A machinery write-up described the application to these industries of a flexible steel conveyor belt made by the Sandvik Steel Works of Sandviken, Sweden.

Potash Production in 1951 Reaches 2,474,870-Ton Mark

The domestic output of marketable potash salts in 1951 again set a new record, with 2,474,870 short tons (1,420,323 tons K_2O), according to reports sent by producers to the U. S. Bureau of Mines. This was a 10 percent increase above the 1950 production. Sales were 2,451,913 tons (1,408,408 tons K_2O), valued at $44,788,880. Stocks in producers' hands at the end of 1951 were 62,597 tons. Potash materials exported in 1951 rose 6 percent in quantity and 37 percent in value over 1950. Both fertilizer and chemical grades showed increases.

Total imports of potash salts increased more than 50 percent in 1951 over 1950, rising from 381,490 short tons (200,529 tons K_2O) in 1950 to 574,361 tons (313,454 tons K_2O) in 1951, the highest reported since 1938. The apparent consumption of potash in terms of approximate K_2O content was 1,653,188 tons, a 17 percent increase over 1950.

The production of both grades of muriate of potash (60-62 percent K_2O minimum and 48-50 percent K_2O minimum) increased in 1951 over 1950. Production of the higher-grade muriate rose 10 percent to a new high of 2,047,793 tons. Production of manure salts dropped to 19,775 tons. The combined production of sulphate of potash and sulphate of potash-magnesia increased 13 percent in 1951, as compared with 1950, to a total of 251,505 tons.

California, New Mexico, and Utah supplied nearly all of the reported potash production, with over 95 percent of the total coming from the Permian deposits of southeastern New Mexico. A fourth company in the Carlsbad area, The Duval Sulphur and Potash Company, began production late in 1951.

Sulphur Supply Increases Balance Domestic Demand

Sulphur supplies have increased since the outbreak of war in Korea to such an extent that they now equal the demand. While sulphur is still under limitation, users are able to obtain all they need and the foreign situation is much easier.

These points were made by Langbourne M. Williams, Jr., president of Freeport Sulphur Company, in a recent statement. The supply will increase by approximately 1,500,000 long tons this year, and about 1,350,000 long tons will be added next year. These increases are expected to meet all anticipated requirements, he stated. New projects are under way that promise to boost world sulphur production by more than 4,000,000 tons within the next three years. This will ease the world demand which has been a factor in causing the short supply in the United States.

New Publication Announced On Dolomitic Lime Putties

Publication of a bulletin entitled *Effect of Aging on the Soundness of Regularly Hydrated Dolomitic Lime Putties* has been announced by Lansing S. Wells, Walter F. Clarke, and Ernest M. Levin (National Bureau of Standards Building Materials and structures Report 127).

The publication reports an NBS investigation to determine whether potentially unsound regularly hydrated dolomitic lime can be rendered sound by soaking as a putty for a reasonable length of time.

The progressive hydration of magnesia upon aging and the decrease in autoclave linear expansion were studied for 18 regularly hydrated dolomitic limes representative of commercial production. When the expansion had been reduced to 1 percent, a suggested specification limit, the proportion of total magnesia hydrated for the different limes ranged from 83 to more than 97 percent. The aging period required to effect the reduction in expansion varied from a minimum of three to more than 32 weeks. Since long and variable aging periods are impractical, the types of lime that give satisfactory performance are discussed for the benefit of the architect, engineer, contractor, plasterer, and others interested.

The bulletin may be ordered (15 cents per copy) from the Government Printing Office, Washington 25, D. C.

U.S. Salt Production in 1951 Passes 20,000,000-Ton Mark

The high level of industrial activity in 1951 was reflected in a record production of 20,207,131 short tons of salt, according to reports of producers to the U. S. Bureau of Mines. Output was 22 percent greater than in 1950. Outstanding features were the 2,500,000-ton increase in the production of salt-in-brine—27 percent more than in the previous year—and the gain of 19 percent—about 750,000 tons—in sales of rock salt. Evaporated salt output gained 10 percent. Total mine-or-refinery value of the salt produced increased $10,000,000 to a peak of $69,735,000 in 1951.

Exports, largely to Canada and Japan, increased to nearly 440,000 tons, but imports declined to only 4,329 tons.

Diesel Units Power 600-Ton-per-Day Plant

• At the George M. Baker operation near Caplinger Mills, Mo., this Caterpillar diesel D364 engine provides power for a portable Cedarapids "Rockit" crusher. Capacity is 600 tons of rock and lime daily.

• This Caterpillar diesel D8800 engine powers the Gardner-Denver compressor which furnishes compressed air to drill 12-ft. holes for blasting.

• Power for this Northwest shovel loading rock into the truck for transfer to the crusher is furnished by a Caterpillar diesel D318 engine.

• George M. Baker, owner of the plant, and V. Nicholson, superintendent of rock and gravel operations.

• A Caterpillar diesel D4 tractor teamed with a Trackson HT4 "Traxcavator" shovel is used for loading pulverized limestone into trucks.

WASHINGTON NEWS LETTER

another P.Q. exclusive

By S. HERBERT UNTERBERGER

WELL OVER nine-tenths of the government employees who were working in Washington before the recent election will continue to work there after the inauguration—and even after the new Administration has been in power for some time. A not inconsiderable number of them—particularly in the old-line agencies such as the Commerce Department, the Interstate Commerce Commission, the Treasury, and the Interior Department—can also recall their experience under the previous Republican Administration.

They are the people who see the machinery of government from the inside out. Their appraisal of what the new Administration will be able to do is likely to be far more reliable than that of the Eisenhower enthusiasts. These "old Washington hands" are saying that the people are likely to get a much smaller change than they voted for. Here is why they believe that.

Millions of citizens gave Eisenhower a vote of confidence because they expect him to do many desirable things. Unfortunately, they did not give that vote to the Republican party, which won only the narrowest of margins in Congress.

They regard this as the principal reason why Eisenhower will not be able to do the many things expected. The program of even the strongest President can be frustrated by a weak and divided Congress. Eisenhower's Congress is not only split between the major parties, but there are also splits within each of the parties. This is the ideal environment for killing legislation. It will be almost impossible to identify those who are to blame.

The substantial changes wrought by the Roosevelt Administration were only possible because of an overwhelming Congressional majority. Even so, Roosevelt's requests were not granted in every case. The most notable example of a Roosevelt defeat was in the Supreme Court fight.

Furthermore, no new President really has the power to clean house completely. A business-oriented Administration would be expected to give early attention to the agencies of government which are responsible for many of the regulations which have been regarded as so onerous. The difficulty will be that the members of the Securities and Exchange Commission, the Federal Communications Commission, the Federal Power Commission, the National Labor Relations Board, and most of the other independent Boards and Agencies are Democrats whose terms have from one to six years to run. It would be unrealistic to expect that these office holders will resign just because the atmosphere is unfriendly.

But the "old Washington hands" say the problem of hostile Democrats in office will be minor by comparison with doing things about the budget and taxes. The Truman Administration understands well the dynamite-laden budget problem. And it has therefore arranged to bring the new Administration in on this problem promptly. It should be remembered that no recent budget has been presented to Congress which has not aroused substantial protest. There is no reason to believe that a Truman budget, no matter how carefully edited by an Eisenhower contact man, will not raise another howl.

No matter what the Eisenhower forces do, they are likely to find themselves in some difficulty. If they raise a Truman figure, they will be accused of violating a campaign promise; if they reduce a proposed appropriation, they are sure to be accused of "taking something away". In the last 20 years, it has always been safe to predict that no matter what budget is submitted, Congress will always end up by appropriating more money than the budget calls for. This is the sort of thing that an Eisenhower Administration would be expected to stop.

Here again, government employees experienced with budgets say that the Congressional setup favors excess appropriations. They explain it this way. With a divided Congress, it is necessary to compromise many interests to get the votes necessary to carry a particular measure. Thus, the easiest way for a group to get the necessary votes for an appropriation they desire is to agree to vote for an appropriation desired by some other group. The inevitable result is more appropriations than planned. But those are the facts of political life in Washington.

On taxes, the problem of making a record is at least equally difficult. Under the present legislation the excess profits tax will die next June 30 and the post-Korea increase in the individual income tax will die next December 31. If an attempt is made to reduce taxes sooner, the deficit is sure to rise. But if Eisenhower permits the legislation to run its course, the Democrats will say that he has acted no differently from the way way they would have.

Finally, the "old Washington hands" say the real test will come when Eisenhower tries to do something about inflation and deflation. Even before his Administration can settle down in Washington, most of the direct economic controls will expire. Short of a condition of all-out war, nothing will be done to revive them. Probably the elimination of wage and price control will have little immediate effect. The real jolt will come if rent controls are finally abandoned. The landlords, whose prices have been under continuous control for a decade, are sure to raise rents substantially. The effect on the cost of living will be immediate and drastic. Otherwise, inflation control will rest upon management of the supply of money and credit. This, as a matter of fact, is an untried method. Thus far principal reliance has been on direct controls.

The Eisenhower Administration will take hold just about the time when the expansion phase of the defense program will be completed. A readjustment with its attendant unemployment may be necessary. An increase in unemployment is something that no Administration—particularly an Administration which is still on trial—can afford. Such a development would give the Eisenhower Administration a difficult time. The budget balancers would try to prevent deficit financing. But the need to stay in power would probably overcome any misgivings. The "old Washington hands" say it is not a question of whether an Eisenhower Administration would use Roosevelt methods for preventing mass unemployment but only *how soon* those methods would be adopted.

The real difference to be expected

(*Continued on page 77*)

Men who depend on power...know they can depend on CUMMINS®

Every CUMMINS DIESEL is built not once but twice

Quarry operators have learned to count on Cummins Diesels for dependable power day in, day out.

What's behind this consistent reliability? One good reason is the fact that every Cummins Diesel is actually built *twice*. After initial assembly, and run-in testing, every engine is disassembled, inspected; then reassembled and tested again.

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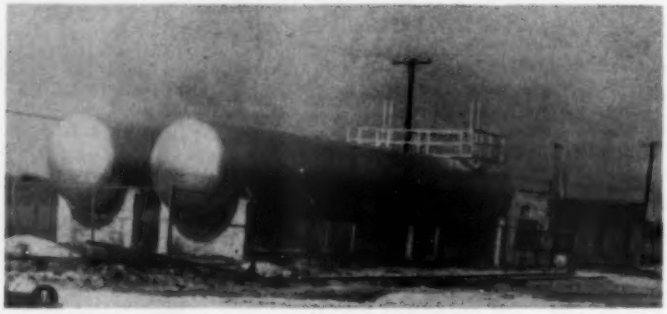
***Leaders** in lightweight, high-speed diesel power!*

Rockwell Lime Company Fires Masonry Kilns with Propane

By C. R. ATHERTON

Atherton and Evans
Consulting Engineers



Two 30,000-gallon propane tanks and the vaporizer house at the Rockwell Lime Company plant. Rail delivery is made on tracks in the foreground.

AN earlier issue of PIT AND QUARRY included an article on the modernization of the shaft kilns at the Rockwell Lime Company, Manitowoc, Wis. It was devoted to a description of the method whereby massive shaft kilns of masonry construction, fired with wood, were placed under induced draft with successful results.

A recent development of particular interest to the lime industry is the fact that these kilns have once more been modified and that they are now fired with propane gas. This installation is believed to be unique in the lime industry in that the two kilns under discussion are the only installations in the country which utilize liquified petroleum gas as fuel.

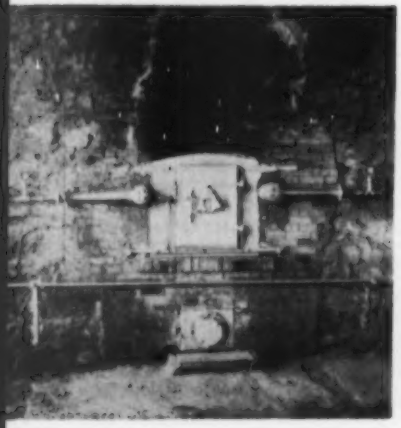
A number of circumstances combined to lead management to the decision to replace wood firing with propane firing. The two chief reasons for the change were (a) the high cost of wood and (b) the undependable nature of wood supply. The high cost of wood fired to the kilns was the product of high initial cost, freight charges for a haul of considerable length, and handling charges at the plant. Minimum handling required unloading from railroad cars to wood wagons, unloading from wood wagons to the kiln-ready wood pile, and hand firing to the kilns. Only a small portion of the wood could be handled in this manner, the greater portion requiring additional unloading, stacking and later reclamation from the wood yard where most of the wood was stored.

In spite of the cost of wood per cord, its availability from regular sources of supply could not be relied upon. The preparation of wood of kiln size in northern Wisconsin has, for many years been a spare time activity engaged in by farmers and lumbermen profitably to utilize otherwise slack time. The recent period of industrial prosperity resulted in a marked decrease in the availability of such slack time, and as a result kiln wood was in short supply. As a matter of fact, during the period immediately prior to the installation of the gas firing system for the kilns the situation was often critical and threatened the kilns with shutdown because of lack of fuel.

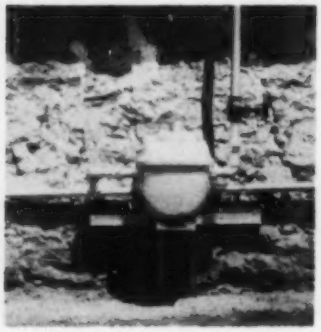
A third reason for the provision of gas firing was the attitude of the younger plant personnel toward the heavy manual work involved in firing the kilns and the fact that the older kiln firemen were approaching the age where such physical work was no longer within their capacity.

The obvious alternatives to wood as a source of fuel—coal and natural gas—were investigated. The cost of both was found to be prohibitive, as was that of oil. It was therefore decided that propane offered the most economical source of fuel, provided that the necessary expenditure could be justified on the basis of probable consumption for all

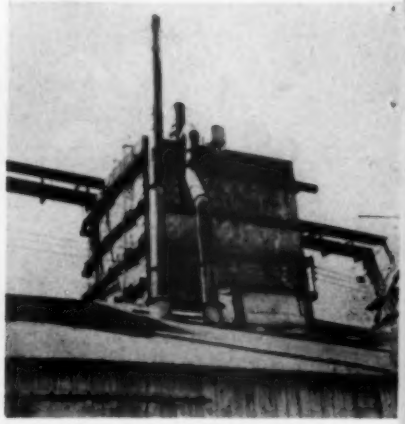
Kiln doors, showing the location of burners, valves, and pressure gauges.



Gas meter installation. The horizontal pipes lead to four burners. A meter is provided on each kiln.



A typical kiln, showing ductwork for the induced-draft installation. The fans are located in the kiln shed.



purposes. The decision of the company to include a rotary kiln in its proposed future expansion program justified the installation of two 30,000 gallon propane tanks, together with the necessary unloading and vaporizing equipment. It should be pointed out that the equipment shown in the accompanying illustrations could not be justified on the basis of the requirements of the two kilns discussed in this article.

The kilns are fired with a gas pressure of approximately 25 p.s.i. at the burners. Wisconsin temperatures are such that maintenance of this pressure requires the use of steam for vaporization except during the warmer months of the year. Accordingly, vaporizing equipment has been provided and is installed in a brick building adjacent to the storage tanks.

Each kiln is equipped with four North American Manufacturing Company Series 70 high-pressure inspirators with gauges, valves, and registers. A careful check on the fuel supply at each kiln is made possible by the installation of a large-capacity Emco meter in connection with each of the kilns.

The heating value of industrial propane is approximately 2,537 B.t.u.'s per cu. ft., as compared to 1,000 B.t.u.'s for natural gas. The maximum flame temperature in air is approximately 3,600 deg. F., and the rate of flame propagation approximately 33.8 in. per second. The combustion of a gas of these characteristics in a vertical kiln, particularly in connection with the calcining of dolomite, requires the exercise of great caution. In the initial phases of operation, when firemen are unfamiliar with its behavior, danger of overheating the kiln is apparent. This danger constituted the chief hazard to early operation.

However, the obstacles which were originally encountered with the new fuel have been gradually eliminated, and very satisfactory performance has been obtained at lower fuel ratios than were anticipated in the preliminary estimates. Current fuel requirements are on the order of 5,900,000 B.t.u.'s per ton of lime produced, which is considered a very acceptable figure for kilns of this type. Start-up following interruption to operation is greatly accelerated in the new installation.

It is quite probable that the fuel costs obtained might not prove acceptable to operators more fortunately situated with regard to their source of fuel. However, the geographical circumstances of the installation under discussion are such that the change from wood to propane has substantially reduced fuel costs and, in addition, has decreased the labor required and insured a constant supply of fuel.

The availability of propane has made management conscious of the possible additional applications of this fuel, so at the present time the company office is heated with a propane heater, the compressors are propane powered, and there is a distinct possibility that as time goes by more and more of the equipment will be provided with propane engines. The advantages of propane in areas where fuel is not only scarce but also expensive merit the consideration of any operators who find themselves in the same position as that of the Rockwell Lime Company.

The development of the new installation was carried on under the direction of Michael Brisch, president of the Rockwell Lime Company, and was designed and supervised by Atherton & Evans, Consulting Engineers, Annville, Pa. Thanks for their cooperation in the development of this unique application are due to W. M. Roberts and Rex Hoy of the Milwaukee office of the Phillips Petroleum Company, whose assistance and helpful advice throughout the course of the development contributed substantially to its success.

Washington News Letter

(*From page 74*)

in the Eisenhower Administration is one of attitude rather than of program. Business, which has felt for 20 years that it has been on the outside looking in, will now be welcome. Not only will businessmen receive a respectful hearing in Washington; but it is likely that many businessmen will be tapped for government service. With businessmen on both sides of the table, they are likely to understand each other.

New Nonmetals Inventory Of Pacific Northwest Issued

A publication containing what is believed to be the most complete inventory to date of the nonmetallic industrial mineral resources of the Pacific Northwest States—Oregon, Washington, Idaho, and Montana—is a report issued recently by the U. S. Bureau of Mines.

The report, entitled *Industrial Minerals of the Pacific Northwest*, was prepared by A. J. Kauffman Jr., a commodity specialist with the Bureau's minerals division. It gives the location, by states and counties, of deposits of each of the following mineral commodities: abrasives (garnet, corundum and silica), asbestos, barite, bauxite, cement materials (including brick and tile), clay, diatomaceous earth, feldspar, fluorspar, gem materials, graphite, gypsum, limestone, magnesium minerals, mica, mineral wool, peat, phosphate rock, quartz crystal, refractories, sand and gravel, stone, talc, and vermiculite.

A wide variety of minerals occur in the Pacific Northwest, according to the report, but the traditional interest in the metallic mineral resources partially has obscured the potentialities of its nonmetallic or industrial minerals. As a consequence, information as to quantity, quality and location of these minerals is inadequate.

This new report describes each industrial mineral and lists its principal commercial uses. Commodities that have a large, localized market predominate in the report. These include portland cement, sand and gravel, stone, clay, and lime. Other outstanding industrial minerals in the region, according to the report, are magnesite, vermiculite, pumice, and diatomaceous earth. The magnesite deposits of Stevens County, Wash., are described as being the largest and most important in the nation. Most of our domestic vermiculite production is obtained from the deposits in Lincoln County, Mont. Oregon and Idaho are ranked third and fourth, respectively, in domestic pumice production. Production figures given for diatomaceous earth show Oregon second and Washington fourth.

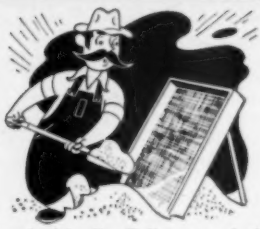
The report states that 85 percent of the nation's phosphate rock reserves are in Idaho, and that the deposits of barite in that state rank with the largest found west of the Mississippi River.

The talc and graphite deposits of Washington and Montana are potentially commercial, even though production has been small to date. Some of the graphite produced in Montana compares favorably with that imported from Ceylon. Potentially important deposits of garnet, corundum, asbestos, feldspar, and the sillimanite group of minerals are found in Montana. In Washington, deposits of olivine, dolomite, and massive serpentine have commercial possibilities.

A free copy of Information Circular 7641, *Industrial Minerals of the Pacific Northwest*, may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

The ninth regional Wage Stabilization Board has approved a request by the Mississippi Lime Company of Missouri, Ste. Genevieve, Mo., for a wage increase of 8 cents per hour for 626 employees in its Peerless and Ste. Genevieve plants. The board also approved a vacation schedule and wage increases in individual job classifications proposed by the company.

Screenings



by William M. Avery

NOW that the sovereign voters have said "Oh, yeah?" to the Democrats' oft repeated assertion that nobody shoots Santa Claus, our readers should be relieved to learn that the jolly old Saint is still hale and hearty and that he plans to make his rounds as usual, come December 24. We made a special trip to Marshall Field's the other day and stood in line for quite a while, along with a lot of other harrassed and worried citizens, until we saw the old fellow in the flesh.

"Me shot?" he boomed in response to our question. "Why, it was so quiet up home on November 4th that Mom and I almost wished we had a television set around the place. And while we're on the subject, I wish you'd just write down in that little notebook of yours that I never told those fellers in Washington they could use my name for political shenanigans. Have a good notion that was just one of the little mistakes that helped beat 'em. See you next year, Sonny."

As long as we were right there, we decided to give Santa's wares the once over. The old gentleman has certainly been busy. We were particularly impressed with the size and ruggedness of the tractors, bulldozers, excavators and ready-mixed concrete trucks the younger set will be operating next year. A clerk we stopped and talked to for a while, swears that a local road contractor was in one morning asking for fleet prices on the entire line as a basis for bidding on several sections of the Congress Street Superhighway!

Descent of Man

A FATHER-AND-SON geology team up in British Columbia has unearthed a number of weapons, including huge granite axes weighing 200 to 300 lb., which they believe could only have been fashioned and used by a race of giant supermen. It never seems to occur to anyone that the forbears of our own race may simply have been better men than we are. If the current pushbutton civilization endures a thousand years, it's a fair bet that our descendants will some day marvel at the ease with which we of this generation wielded our Boy Scout axes. Fact is, we're just a little awed right now.

Speed Up

SOMEBODY with a good deal of spare time on his hands has worked out comparative figures on the man-hours per cu. yd. required to build the Great Pyramid of Cheops and the Grand Coulee Dam. According to this unidentified authority, the 3,000,000 cu. yd. of masonry which comprises the pyramid represents about 400 man-hours of labor per cu. yd., compared with about 3 man-hours per cu. yd. for the 10,500,000 cu. yd. of concrete in the dam.

The business agents of several well-known unions are going to raise merry hell with somebody when these facts are brought to their attention. It just goes to show what can happen when there's a slave-labor law like the Taft-Hartley Act kicking around.

Quiet, Please!

SENT one of our Hawkshaws, a fellow named Stanislaus, over to the Illinois Institute of Technology the other day to savor the delights of the Third Annual Noise Abatement Symposium. His unedited report, forwarded to us from the Chicago Avenue Police Station, reads as follows: "Gastly affair. Got trapped in revolving doors, thus arrived after meeting in progress. On way in, door to meeting room squeaked badly. Fellow on platform stopped whispering to audience in order to glare at me. Shoes squeaked like two steam caliopes as tip-toed to vacant seat. Seat squeaked like an air-raid siren as sat down. With whole assembly scowling in my direction, developed case of loudest hiccups in medical history. Made fairly dignified withdrawal, except for squeaks and hiccups. Holed up in nearby bistro to plan new strategy."

No Place Like Home

A NEWS report from Atlanta, reveals that 12 of 15 inmates of Rock Quarry Prison for incorrigibles have firmly declined a good behavior transfer to other accommodations. Now we suppose there'll be a full-dress investigation to determine what goes on at Rock Quarry to win such touching allegiance. If the prison authorities have been to the movies at all in the last ten years, they should be able to figure it out: no tough guy who has the slightest regard for his professional reputation wants a good-conduct rap chalked up against him.

Comparative

ACCORDING to *Science News Letter*, a material called "soft concrete," developed for use in basementless houses, has almost as much resilience as oak flooring. There is also, of course, a material known as "fresh concrete" which has a hell of a lot *more* resilience than most mattresses. Just thought we'd mention it for the record.

Ask a Silny Question

A READER wants to know whether or not the "n" in kiln is entirely silent. We can think of no more conclusive a reply than to quote in its entirety a sad little verse which appeared in the November issue of *The Dragon:*

His Name Was Biln

Once a kiln worker tending a kiln
Lost his footing and took a bad spiln;
When he came out as clinker
His boss said, "That stinker
Wiln give a bad name to our miln."

man-sized LOADS ARE child's play FOR MACK SIX-WHEELERS

Man-sized loads over bruising terrain are child's play for Mack six-wheel trucks because they have the unique advantage of Mack's Balanced Bogie with exclusive Power Divider.

You save time and money with the Mack Power Divider because it distributes power to the wheels having traction under the toughest conditions—hub-deep mud, slippery sand or rock-strewn ground. Acting as a true differential, the Power Divider delivers torque between the two bogie axles and between the four driving wheels in proportion to wheel traction—thus eliminating useless wheel slippage and spinning.

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Mack TRUCKS

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Public Relations

Eastern firm's good neighbor policy enables quarry to operate without annoyance to nearby home owners.

Francis K. Gallaher, mill superintendent, and Thomas J. Stewart, plant superintendent.

By WILLIAM M. AVERY

ALL branches of business and industry are today more keenly aware than ever before in history of the far-reaching importance of developing and maintaining sound public relations policies. No doubt, a fair share of the problems encountered in the pursuit of good public relations are common to all branches of industry, but quarry operators appear to have a few special headaches all their own—most of them originating in the clash of interests which almost inevitably results whenever residential areas are developed adjacent or close to operating quarries.

In the situation referred to, one of the most difficult tasks of management is to devise ways and means of operating as inconspicuously and efficiently as possible. Indeed, this appears to be the only effective defense, both public-relations-wise and legal, which management can adopt, for the courts in recent years have been increasingly prone to rule against corporations in litigation involving the rights, comfort, and convenience of home owners

A situation of this sort was encountered recently by the North Jersey Quarry Company in connection with one of its properties located at Millington, N. J. It could very easily have resulted in injunctive proceedings which might have forever have halted the development of a valuable stone deposit. Instead, management succeeded in developing a many-faceted program which made it possible to operate without any sort or degree of offense to home owners in the immediate vicinity. Apart from accomplishing this primary objective, it is interesting to note that virtually all of the measures adopted have yielded important benefits affecting both the efficiency and the economy of overall operations.

The quarry near Millington was opened up in 1895 by the Morris County Crushed Stone Company, which later was consolidated with the North Jersey Quarry Company. The property was operated on a reasonably continuous basis until 1937, when it was shut down for the purpose of rebuilding the crushing and screening plant. Business conditions, and subsequently the outbreak of World War II, delayed the proposed building program, and the new plant was not placed in operation until 1950.

During the intervening years, the adjacent land areas were extensively developed for residential purposes, and some of the nearer neighbors registered acute alarm almost as soon as it became known that the company planned to resume crushing operations. North Jersey's management accepted the situation as a challenge, and set out to demonstrate that a stone plant could be so designed and the quarry so operated that the anticipated clash of interests would never take place.

Blasting, of course, was a major cause for concern, and no effort or expense was spared in developing methods that would, so far as possible, eliminate any valid cause for complaint on the grounds of either

A general view of the North Jersey Quarry Company's plant at Millington, N. J. The arrow indicates the greenhouse on the quarry floor. Note the absence of a dust halo around the buildings in the distance, although the plant was in full production when this photo was taken.

A closeup of the greenhouse which the company built to demonstrate that modern quarry blasting has no serious effect on buildings even within close range. At the closest point, the face in the background is about 400 ft. from the greenhouse.

Right: A machine-gun photo of a progressive milli-second delay blast at Millington two-thirds of a second after detonation.

Second illustration: A full second after the start of detonation the blast reaches its peak. The milli-second progression is from left to right.

Third illustration: Two full seconds after detonation this photo shows evidence of continued blasting action.

annoyance or actual damage. The work was done in close cooperation with Dr. L. Don Leet, seismologist of Harvard University, and extensive use was made of Leet three-component seismographic records in order to determine which procedures gave the best results.

Obviously the avoidance of complaints was not the only objective of this work, since management was well aware of the importance of yield and fragmentation in over-all economy. In the search for an optimum technique all the possible variables of quarry work were employed, including size, depth, number, and spacing of holes; burden; method of loading; use of stemming; location of caps; and various patterns of Rockmaster millisecond delay shooting.

Relatively fixed techniques have evolved as a result of this intense initial study, combined with careful evaluation of subsequent experience in actual operations. Bucyrus-Erie, Loomis, and Keystone well drills are used to put down 6-in. diameter blast holes spaced 18 ft. apart in a single row. The burden is also usually 18 ft. There are seven holes in most blasts, the odd number having been found to result in the least vibration. Holes are drilled to the floorline only—*never* below that level.

Holes are charged with Apex No. 2 medium velocity and 60 percent extra dynamite, each hole having either two or three decks of charge, and each deck having two blasting caps. The holes are detonated progressively, using Rockmaster No. 0, 2, 3, 4, 5, 6, and 7 millisecond delay caps. Experience has established that a powder factor of about 4.5 is ideal for the extremely hard trap basalt rock in the Millington deposit, and considerable care is exercised to maintain this approximate ratio while limiting throw to 1½ to 2 times the height of face. The present quarry face is about 2,000 ft. long and averages close to 75 ft. in height.

Right: Ready for the shovels to go to work, the rock pile contains relatively little oversize, and the distribution is good.

Almost all secondary breaking is done with the drop ball in preference to the noise of blockholing. The shovel in the background is loading one of the side-dump semi- trailers.

The toe is drilled and blasted separately, using many lightly-loaded holes in order to avoid vibration as much as possible. This practice is necessitated entirely because of the unusual practice of keeping primary blast holes altogether above the floorline. In this phase of the work Ingersoll-Rand wagon drills and portable compressors are used.

The technique outlined above brings down from 12,000 to 17,000 tons per shot, and there are many such blasts set off per year. Seismographic records are made of the effects of each blast, using four separate machines which are set up at strategic points on and adjacent to the company's property. There are actually three fixed seismograph stations which are connected with the quarry by telephone at the time of each blast. When the fourth machine is used, it is occasionally set up in a private residence near the quarry to demonstrate graphically how little acual jar is associated with the company's blasting operations. In such cases the telephone company plugs the residence phone in on the quarry system so that all four machines are placed in operation at the same instant before the blast goes off.

The company has encouraged its neighbors to request such demonstrations in the belief that it promotes better understanding. As a rule, of course, the demonstration follows a complaint, and it provides a prime opportunity to show that normal household activity produces far more vibration than does a quarry blast. In a typical case the seismograph, set up in a neighbor's living room, showed a resultant of .001 in. due to a primary blast at the quarry; when the owner flexed his knees at the suggestion of the operator who was conducting the demonstration, the film showed 20 or 25 times as much displacement.

To keep its blasting operations as inconspicuous as possible, every effort is made to set off all primary shots from a half hour to an hour before noon, always on week days. This practice is based on the sound theory that at that hour of the morning mothers are busy getting lunch, and their offspring, regardless of age, are most likely to be awake.

Recognizing from the start that some people would be totally unable to understand (and would therefore disbelieve) the scientifically sound testimony of the seismographs, the company hit upon another much simpler means of demonstrating that its blasts couldn't possibly damage neighboring property. A small greenhouse was built on the quarry floor approximately 400 ft. from the working face. The construction was conventional in all respects, and no provision of any kind was incorporated to shield the glass panes from either air blast or ground-wave shock.

This structure has been up several years, and has come through scores of blasts without a single cracked pane of glass. Nobody has even bothered to take the elementary precaution of opening the windows when a blast is to be set off. The greenhouse makes a telling point, and has been well worth the small investment it represents. With the nearest house some 2,000 ft. from the quarry face, even a thoroughly irate citizen calms down almost wholly when he is shown an undamaged, flimsy glass structure located within a stone's throw of the very blast he came over to complain about.

This bit of psychological maneuvering has paid a small but entirely unexpected dividend, for the greenhouse has made an ideal field office for the quarry superintendent. It is used, of course, for growing flowers the year round, and some of the quarry men plan to raise tomatoes in it this winter. The building is equipped with a desk, a telephone, and an electric heater, and it is probably the only quarry field office in creation that is decorated with fresh flowers almost every day of the year.

The blasting practices at Millington which have enabled the company to live in amity with its neighbors have also yielded good results from a strictly utilitarian point of view. Fragmentation is excellent; throw can be controlled within acceptable limits; there is relatively

Left: Dudley Jackson, quarry superintendent uses the greenhouse as a year-round field office. Ordinary single-strength glass is used throughout the building.

Right: A noteworthy feature of North Jersey's blasting control is the use of several Leet three-component seismographs in connection with each primary blast. The machine seen here in the entranceway of the plant office at Millington is ready to record the effects of a blast.

Left: Primary equipment for the liquid diffusion dust control system is shown here. Non-toxic diffusion compound in water solution is pumped from this central location to spray nozzles at points of maximum dust generation throughout the plant.

Right: Three spray nozzles over the conveyor are directing a fine mist of compound at newly-fractured stone to control dust at the source. The mist is invisible, but note the darker color of the stone in the foreground which has been sprayed.

little backbreak; a sheer clean face can be maintained without too much trouble; and all-round blasting efficiency appears to be all that could be desired. About five percent of the total tonnage requires secondary breaking before the material is hauled to the 42- by 48-in. primary jaw crusher.

Practically all of this secondary breaking in the quarry is done with a two-ton drop ball, which is handled by means of a Bucyrus-Erie B-2 oil-fired steam crane mounting a 45-ft. boom. Although the drop ball was selected initially in order to dispense with the noise of secondary drilling and blockholing, it has been found to have in addition some economic advantages over the latter practice.

Other major items of equipment in the quarry include the following: an International T.D.-14 tractor-bulldozer used for stripping, road maintenance, and clean-up work, a Lorain 820 2-cu. yd. diesel shovel used for stripping and loading; two Marion electric shovels of 2½ and 2-cu. yd. capacity used for loading; and a fleet of five Easton TR-10 side-dump semi-trailers, drawn by Ford F-8 tractors, which haul the stone from the face to the primary crusher.

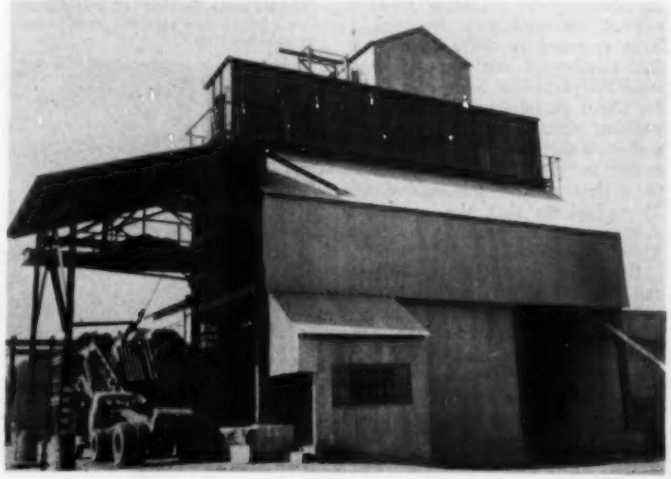
Up to this point we have talked only about measures adopted in the quarry proper, but the design of the crushing and screening plant presented some almost equally perplexing problems. The basic objective was to design and build facilities with which it would be possible to crush, size, store, and load out some 2,000 tons per day of material without in any way disturbing the tranquility of some very alert and watchful owners of nearby homes.

The two most serious problems were, of course, dust and noise. The original plant design, by the North Jersey Quarry Company with the aid of the Link-Belt Co., included provisions for both a mechanical recovery system and a liquid diffusion control system, and not a pound of material was produced until it was certain that this two-pronged attack would actually take care of the dust problem.

For the mechanical system a 6-pocket Sly bag-type collector was selected. This is connected by means of an elaborate system of sheet-metal duct work to every transfer point and screen throughout the plant. Depending on the moisture content of the stone, from 3 to 5 tons of dust is collected each day with this system. This material is discharged once a day from the hoppers into a Fuller-Huron Airslide for disposal, this conveyor discharging in turn into a covered truck which hauls the dust to the stripping dump.

Additional dust control by means of liquid diffusion is achieved with a Johnson March automatic spray system serving points of maximum dust generation throughout the plant. The use of a non-toxic liquid diffusion material known as Compound M-200 in water solution makes it possible to control the dust at its source by the addition of less than one half of one percent moisture to the stone. The solution is pumped automatically from a central storage point to spray nozzles located just above the conveyor belts at the various locations served by the system. Although the fine spray which comes from the nozzles is almost invisible, it is remarkably effective in controlling even the finest dust. Mechanical cut-off devices automatically interrupt the flow of solution to each battery of sprays when there is no stone on the related conveyors.

As a result of these elaborate provisions for dust control the plant at Millington probably releases as little dust to the surrounding atmosphere as any comparable stone op-



A bag-type dust collector, mounted high above the primary crusher, is connected by duct work to various screens and transfer points throughout the plant.

One of the vibrating screens, showing the encolusure and some of the duct work for mechanical dust recovery.

This view, taken with a flash camera, could not have been obtained by that method without an effective dust control system in operation. Dust generated at one of the transfer points is drawn through the hood into the duct system.

eration in the country. Even in the dryest periods, and with the plant in full production, there is no halo of visible dust hanging over the buildings.

The effectiveness of dust control is even more striking at close range. Any photographer who attempts to take flash pictures inside a dusty plant finds that all he can usually expect to record on his negative is a peasoup fog. Each minute particle of dust reflects the light of the flash bulb almost as though it were a mirror, and the literally millions of such reflections in a single exposure create the illusion of fog. Actually the dust count need not be particularly high for this to happen, for it occurs quite frequently even when the dust is scarcely apparent to the eye.

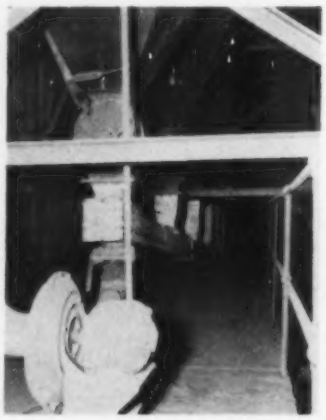
By merest chance our visit to the Millington plant occurred during an extremely dry period, and under normal circumstances we would have expected to defer at least a fair number of our flash pictures until the plant had been shut down for about 30 minutes. The accompanying pictures, all taken by flash and with the facilities shown in full operation, are convincing evidence of a dust control job well done. Tests indicate that the combined dust control systems are at least 95 percent efficient.

Rigid dust control at the Millington plant has done a good deal more than help North Jersey to get along with its neighbors. The men who work in the plant appreciate the comfort and health protection which it means to them, and there is evidence that equipment-cleaning and maintenance costs have been affected favorably.

Recognizing that the best dust control system in the world isn't worth a hang unless it is kept at peak efficiency, the company has seen to it that both systems at the Millington plant are carefully inspected at regular intervals. The entire duct-work system is gone over periodically by a crew of sheet metal workers, and any mechanical fault found in eather system is corrected at once. This results in a uniformaly good job of dust control *all* the time. As an additional dust control measure, all roads on the property are oiled once or twice a year, and roads in the quarry proper have been black-topped.

North Jersey's management felt compelled to give careful consideration to the problem of noise abatement. Although the Milllington property is bounded on one side by a river and on another by a railroad, it is none the less pretty well hemmed in by private homes, several of which are close enough to be directly affected by even the most ordinary plant noises.

Hoppers under the dust collector discharge into a low-pressure air conveyor for transfer to a disposal truck.



It was recognized right from the start that the time factor was of tremendous importance; *i.e.*, the same noise that might go unnoticed at high noon would almost surely evoke complaints if it occurred at midnight. In accordance with this theory it is a flat rule not to operate *any* machinery before seven o'clock in the morning or after six o'clock in the evening. Actually the plant proper is shut down by 5 p.m. on week days and by 1 p.m. on Saturdays. There are no operations of any description on Sundays or on legal holidays.

In the design and consruction of the plant careful consideration was given to means of confining and absorbing the noise of loading operations. With this purpose in view the area below the storage bins was enclosed as completely as possible with concrete masonry curtain walls. These are not only surprisingly effective in confining loading noises, but appear to constitute an equally effective barrier to the crushing, screening, and transfer noises generated in the plant proper.

The company has also experimented with heavy applications of undercoating material on chutes, transfer points, truck bodies and

(*Continued on page* 93)

A Novel Method of Controlled Heat Release In Rotary Kilns

By THEODORE NAGEL

THE decrease in the purchasing power of the dollar, which is now estimated at 52 cents, is reflected in the high capital cost per barrel of annual capacity required to construct a new portland cement plant; consequently, it becomes increasingly important for a cement producer to operate his present equipment in the most efficient and economical manner.

A major factor in the cost make-up of portland cement is the plant cost of the clinker output; in fact, it constitutes approximately two-thirds of the bin cost of manufacturing portland cement. The capacity of a cement plant is to a great degree contingent upon the quantity of clinker produced, and the production costs are determined by the equipment and method employed and the efficiency with which they are operated.

The one department in which substantial economy can be achieved is in the burning department. Under present-day normal operating conditions, the ratio between cost of fuel and other costs of burning is about 9 to 1, and it becomes apparent that greater fuel efficiency, whether achieved with less fuel per barrel of clinker or by increased output with the same hourly fuel input, is the one item which can lower the bin cost of cement.

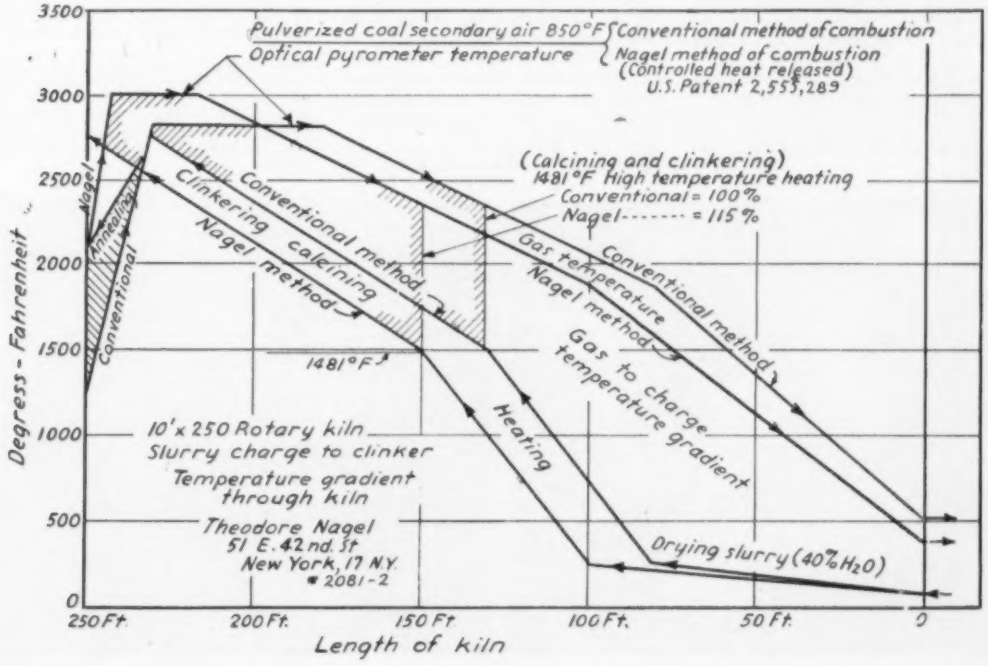
A patent recently granted to the writer covers a novel method of burning all types of fuel in rotary kilns, which not only affects fuel economy but also increases hourly output of clinker.

The Nagel method of kiln operation, briefly described, injects a stream of fuel into the kiln so controlled as to produce a wide, flat flame parallel to the surface of the charge flowing through the clinkering zone. This is in contrast to conventional methods, wherein the injected fuel bushes out into a cylindrical flame on flowing forward in the clinkering zone of the kiln, substantially filling the space *not* occupied by the charge and transferring approximately 75 percent of its radiant heat to the refractory lining in the clinkering zone—a substantial waste of high-temperature clinkering heat.

The flame of the Nagel method, its shape controlled to a comparatively shallow, flat sheet confined close to the charge, transfers approximately 50 percent of its liberated radiant heat directly to the charge. It also moves the clinkering-temperature zone forward to the kiln exit, thereby inhibiting annealing of the clinker within the kiln. (See chart of temperature gradient through the kiln). Because by this new method more high-temperature heat is radiated to the charge in the clinkering zone per unit of fuel burned, more clinker is produced per unit of fuel.

The additional plant capacity produced by the Nagel method of kiln operation can be immediately effected without the necessity of purchasing new equipment, except for possible bottlenecks in raw and/or finish grinding capacity; the addi-

(Continued on page 100)



40th National Safety Congress Honors Pioneer Safety Men

Cement-Quarry Section Sessions Cover Practical Safety Procedures

By KENNETH A. GUTSCHICK

James F. Collins, Universal Atlas Cement Co., places slide of job procedure in projector prior to talk on "Job Training for Safety".

THE 40th National Safety Congress and Exposition sponsored by the National Safety Council was held in Chicago October 20-24. Considering that more than 12,000 delegates attended the gala convention, it was a great contrast to the modest, inconspicuous First Co-operative Safety Congress held in Milwaukee in 1912 in which only 250 safety men participated. One of the main purposes of the 1952 congress was to celebrate and commemorate this important 40th anniversary. A highlight was the honoring of the pioneer members who attended the First Congress at the annual banquet held the evening of October 22.

Throughout the congress emphasis was placed on the steady progress that has been made in accident prevention during the last four decades. In fact, National Safety Council personnel estimated that 500,000 lives have been saved through the combined efforts of countless safety-minded individuals since the organized safety movement began in 1912. This figure was based on the accidental death rate in 1900-1912 and in succeeding years. However, the council pointed out that in spite of this notable progress, there is great need for further improvement, as evidenced by the fact that in 1951 94,000 persons were accidentally killed and ten times that number injured at a cost of approximately $7,900,000,000.

The outstanding feature of the congress was its great size. Individual section meetings were held in five of Chicago's leading hotels, including the Conrad Hilton, which served as the headquarters, and the Congress, LaSalle, Morrison, and Sheraton. More than 200 technical sessions were held, covering every conceivable phase of safety. More than 600 persons spoke before the 12,000 delegates who came from all over the world.

The safety exposition, one of the largest ever held, consisted of nearly 200 colorful exhibits which featured all types of up-to-date safety equipment and supplies. It was held in the exhibition hall and annex and on the second and third floors of the Hilton Hotel. Representatives from leading manufacturing concerns were present to explain and demonstrate the latest developments in safety equipment.

The keynote of the 40th Congress, namely the need for co-operation in the safety movement, was expressed

John Murdock, Warner Co., (left) displays photographs of electrical hazards to interested spectators G. E. Midyette, Superior Stone Co., Raleigh, N. C., and Paul Frey, Pittsburgh Coke and Chemical Co., Pittsburgh.

Three safety men who played a large part in the 1952 Cement and Quarry Section program are (left to right): Lea Warner, Jr., outgoing chairman; C. A. Gustafson, speaker on plant maintenance in a safety program; and M. C. M. Pollard, incoming chairman.

by Ned H. Dearborn, president of the National Safety Council, at the annual council meeting held on October 20 in the Grand Ballroom of the Hilton hotel. He strongly urged that the scope of the safety movement must immediately be extended to include not only all existing safety organizations but also many economic and social movements whose primary interests may not be safety but which may properly claim some kinship. Such groups include medical associations, trade associations, better roads associations, and other similar groups. After illustrating his main point in detail, Mr. Dearborn concluded by expressing confidence that this extensive co-operation in safety will eventually come about; however, he admonished that this co-operative spirit must be adopted soon if the safety movement is to progress.

During the annual council meeting the election of executive officers for 1952-53 was held, and Mr. Dearborn was re-elected to serve his tenth term as president of the National Safety Council. E. F. du Pont, director of employee relations, E. I. du Pont de Nemours and Company, Wilmington, Del., was elected chairman of the board of directors of the council, while Franklin M. Kreml, Northwestern University Traffic Institute, was elected vice-chairman of the board. Other council officers elected were as follows: George F. Getz Jr., president Globe Corporation, vice-presdent for finance and treasurer; Dr. William P. Yant, director of research and development, Mine Safety Appliances Company, vice-president for industry; R. L. Forney, general secretary (re-elected); and B. B. McCulloch and H. H. Greenwald, assistant treasurers (re-elected).

Seated (left to right): W. J. Scahill, Missouri Portland Cement Co.; T. W. Jones, New Haven Trap Rock Co. (Cement and Quarry Section vice-chairman); M. C. M. Pollard, National Gypsum Co. (chairman); and S. B. Fleming, New York Trap Rock Corp. (news letter editor). Standing (left to right): Lea Warner, Jr., The Warner Co.; F. R. Dittoe, Kelley Island Lime and Transport Co.; C. J. Herzog, Dravo Corp.; and L. D. Cowling, Louisville Cement Co. (engineering committee chairman).

CEMENT & QUARRY SECTION

Following the council meeting the numerous sections of the National Safety Council held their individual group meetings. The Cement and Quarry Section, holding a longer meeting than usual, met in three afternoon sessions in the Hilton Hotel on October 21, 22, and 23. Each session was attended by nearly 100 persons. The program was well organized and diversified, featuring talks on individual plant safety problems (Tuesday), the responsibility of management in safety (Wednesday), and the use of visual aids in a safety program (Thursday). Interesting discussions followed each talk, which helped clarify the viewpoints of the speakers.

Plant Safety Problems Lea P. Warner Jr., general chairman of the Cement and Quarry Section, and personnel and safety manager of the Warner Company, Philadelphia, began the Tues-

Gil G. Grieve, National Safety Council, helped make the 1952 Cement and Quarry session a big success.

A. E. Diem, Dictaphone Corp., strongly emphasized the responsibility management has toward the safety of its employees.

M. A. Gimbel, Rohm and Haas Chemical Co., pointed out that if safety engineering is to succeed, it must include human engineering.

day session on plant safety problems with a brief annual report. He announced that 36 additional companies had recently joined the section, bringing the total membership to 280. Mr. Warner briefly discussed the activities of the executive committee during the last year.

The first paper was presented by James F. Collins, supervisor of training, Universal Atlas Cement Company, New York, on the subject *Job Training For Safety*. Mr. Collins began by stating that a plant safety program, to succeed, must not only include the safeguarding of machinery, equipment, and materials; more important, the individual should be trained to work in the plant. This second item is extremely important, as evidenced by the fact that more than 85 percent of industrial accidents result from lack of knowledge or care on the part of the individual employee.

According to Mr. Collins, job training, to be effective, should be directed to the individual worker on an individual job instead of a group of workers in a general way mainly because it is the individual worker who gets hurt. Proper job instruction tells the worker what to do, how to do it efficiently and safely, and how his job is related to other jobs in the plant.

In addition to providing most effective safety training, individual job training fills two vital psychological needs of the worker, namely the feeling of belonging and recognition. If each worker, regardless of his job, feels his own importance in the company's organization, he will strive to work at his best.

Mr. Collins then described how Universal Atlas is going about job training. First the company is undertaking the formidable project of writing detailed job procedures on the more important jobs or operations, which are used as a basic guide for instruction by their supervisors. These procedures not only include the operational steps in sequence but also key points that help the employee perform his job smoothly and safely. Used in conjunction with the job procedure is the job training chart, which is filled out by the foreman. It is used to analyze the performance of the work force and to serve as a checklist when training an individual employee in a specific task. The chart highlights the training area in whch a foreman should concentrate his training efforts. That the above method is thorough was indicated by sample job procedure and training charts which were projected on the screen.

A. B. Hofteizer, Laverack and Haines, Inc., did a good job of selling safety engineers on the idea of making their own visual aids.

In concluding, Mr. Collins pointed out that his company is planning to supplement the above procedure by a new method of accident analysis, which will pin point areas of concentration for intensive job instruction.

In a talk on *Electrical Hazards in Small Plants*, John Murdock, master mechanic and chief electrician, Cedar Hollow plant, Warner Company, Devault, Pa., told of the excellent progress his company has made in eliminating electrical hazards. He showed a series of slides which illustrated common electrical hazards, as well as the means for overcoming them. Among the numerous hazards discussed were the following: failure to check circuits properly before working on them; failure to use multiple locks; failure to use proper tools and protective equipment; failure to use safe ladders; the use of haphazard temporary lighting cords and wiring, which later may become permanent; failure to observe state and federal safety codes; indoor use of oil instead of air-cooled transformers; improper handling of capacitors; failure to screen off grid resistors; drying clothes on grid resistors and motors; improper grounding; failure to replace old and rotted electric poles; and use of electrical switches and boxes for storing rags, bottles, etc.

In addition, Mr. Murdock pointed to unsafe practices of the engineering department in installing electrically-driven machinery, including failure to allow for proper headroom and proper overhead rigging needed in removing motors during repair; the use of wrong or obsolete equipment; failure to build platforms to assist in proper operation and maintenance of motors and machinery; and failure to protect motors and electrical equipment against heat and dust.

C. A. Gustafson, superintendent, The Callanan Road Improvement Company, S. Bethlehem, N. Y., speaking on *Plant Maintenance and Its Tie-In With the Safety Program*, began by stating that maintenance, safety, and production are so closely related that without one, the other two suffer. His major point was that a good safety-minded maintenance crew is one of the best tools a safety director has at his disposal. Sell them safety, and they will sell it to the workers, he suggested. A good crew can point out potential hazards as they come up in the course of normal repairs. Also by being "gadgeteers", they strive to simplify jobs and equipment, thereby promoting safety.

Mr. Gustafson advocated the use of chain hoists, a hoist truck, and other maintenance equipment for inumerable types of repair jobs around a quarry. He also briefly discussed the reflectoscope* as a valuable safety tool used in detecting flaws and cracks in crusher shafts, well drill bars, etc.

Mr. Gustafson concluded by discussing a subject often neglected by quarry owners, namely the maintenance of quarry haulage units (not just delivery trucks) and haulage roads. He maintained that safety and longer life of equipment can be obtained by keeping trucks and roads in the best possible condition.

Election of Officers The Tuesday afternoon session was concluded with the election of officers for the 1952-1953 Cement and Quarry Section executive committee. M. C. M. Pollard, National Gypsum Company, Buffalo, N. Y., was elected general chairman, succeeding Lea P. Warner Jr., who was elected a member at large. Also elected were the following: vice-chairman, T. W. Jones, New Haven Trap Rock Company, New Haven, Conn.; secretary, Kent Jander, National Lime Association, Washington, D. C. (re-elected); news letter editor, Seymour B. Fleming, New York Trap Rock Corporation, Newburgh, N. Y. (re-elected); engineering committee chairman, L. D. Cowling, Louisville Cement Corporation, Speed, Ind (re-elected); membership committee chairman,

*See August, 1951, Issue of PIT AND QUARRY, pp. 103-4, for discussion of the reflectoscope.

Howard Riefenstahl, Alpha Portland Cement Company, Easton, Pa.; program committee chairman, Harvey F. Yotter, The General Crushed Stone Company, Easton, Pa. (re-elected); statistics committee chairman, C. A. Gustafson, The Callanan Road Improvement Company, South Bethlehem, N. Y.; and visual aid committee chairman, H. G. Collins, Lehigh Portland Cement Company, Allentown, Pa. (re-elected). G. G. Grieve was also re-elected staff representative, Cement and Quarry Section, National Safety Council, Chicago.

Managerial Attitude Toward Safety The second afternoon session, devoted more to the managerial attitude toward safety in industry, was opened with a dynamic talk by A. E. Diem, vice-president of manufacturing, Dictaphone Corporation, Bridgeport, Conn., who spoke on *Management and Safety*. Mr. Diem's major point was that management has the duty of accepting the responsibility for its employees, a duty in which he claimed management has greatly failed. The motive behind this responsibility should not be a matter of dollars and cents, as it often is, but rather it should be humanitarian.

Mr. Diem discussed six ways in which management should discharge its responsibility for safety. First, it should provide a pleasant atmosphere for employees to work in, so that employees derive satisfaction from their work. Statistics have born out the fact that firms with the best labor-management relations have the fewest accidents. Secondly, management should be on guard to detect employees suffering from mental anguish. These individuals should then be counselled in order to put them in the right frame of mind for working. Management should also provide the inspiration, spirit, and money to make their plant a safe and efficient place in which to work. In addition, constant inspection should be made to detect unsafe practices. Mr. Diem was very emphatic in urging that plant operations should be shut down until the unsafe practices are properly remedied. It is also a duty of management to back the plant safety engineer to the hilt. Finally, management should establish well-defined objectives, not only for itself but for all in the organization. In concluding, Mr. Diem stated that if management does not adopt these principles, then it is the chief responsibility of the safety engineer to see that it does. He half-humorously added that if management still refuses, then the safety engineer should find a new job.

M. A. Gimbel, safety engineer, Bridesburg plant of The Rohm and Haas Chemical Company, Philadelphia, Pa., concluded the Tuesday afternoon session with a talk entitled *What Are We Doing About Safety*. He stated that considerable progress has already been attained in industrial accident prevention, citing the highly industrialized state of Pennsylvania as one outstanding example. He pointed out that in spite of the increase in number of plants and employees since 1916, fatalities in quarrying and nonmetallic mining dropped from 48 in 1916 to 13 in 1950, and non-fatal accidents dropped from 2,625 to 709 in the same period (according to Bureau of Workmen's Compensation). However, in spite of such progress, Mr. Gimbel felt that there is still room for great improvement.

Departing considerably from his prepared text, Mr. Gimbel touched on numerous facets in safety engineering. Claiming that there is no magic formula in accident prevention, he declared that three fundamentals of a safety program must be recognized: adequate guarding of machinery; teaching employees to work properly, which means safely; and having management, supervisors, and all employees understand, accept, and discharge their respective resonsibilities in preventing personal injury.

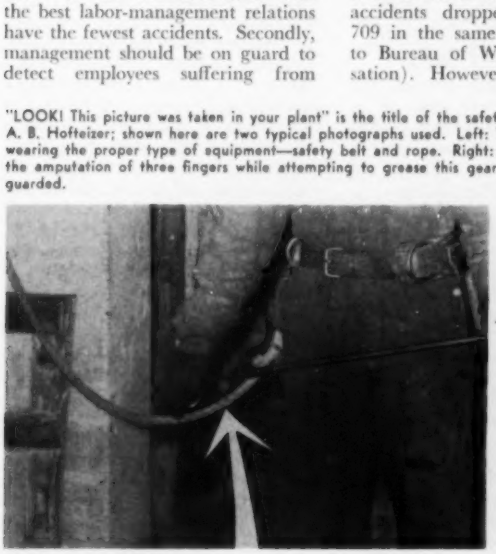
One major point stressed by Mr. Gimbel was that safety engineering must include human engineering if it is to succeed. Thus, safety must come from within the individual. Job training should be carefully planned and executed and psychology should be used wherever possible. The individual must be told not only how to perform his job but also why he should do it in such a manner. Safety should be made part of every operation. Then, in all dealings with the worker, he should be treated fairly and kindly.

He further stated that the individual must be made to understand that safety is primarily for his benefit. Thus, for example, emphasis should be placed on eye protection rather than on eye goggles.

Mr. Gimbel also gave helpful suggestions. He urged that companies should hold large safety meetings at least once a month. Furthermore, supervisors and foremen should regularly hold short sessions on safety, preferably at the start of a day's work or the start of a major repair job.

Mr. Gimbel also frowned upon various fallacies regarding safety, including such expressions as "your time is up", "life is a gamble", "the law of averages", "the price of prog-

"LOOK! This picture was taken in your plant" is the title of the safety bulletin described by A. B. Hofteizer; shown here are two typical photographs used. Left: This crusher operator is wearing the proper type of equipment—safety belt and rope. Right: This employee suffered the amputation of three fingers while attempting to grease this gear, which was improperly guarded.



ress", "it is easy to talk safety but difficult to act", "I have no time for safety"—all statements which create a careless attitude on the part of the employee.

A highlight of the Cement and Quarry meeting was a luncheon held on Wednesday; it was one of the first held in a number of years. Before a luncheon group of about 50, Major Charles T. Estes, special representative, Federal Mediation and Conciliation Service, Washington, spoke on the subject of human relations in management-labor disputes. Major Estes pointed out that much of the difficulty in U. S. labor relations revolves around the poor communication of ideas to the workers by the supervisory staff and union leaders and the failure of supervisors and foremen to use more of an indirect approach in dealing with employees.

Visual Aids The remainder of the Wednesday afternoon session was devoted to one major phase of a safety program, namely the use of visual aids. Contributions in visual aids made by the National Safety Council, a trade association, and an individual company were featured on the program.

Gil G. Grieve, staff representative, Cement and Quarry section, National Safety Council, presented a sound-slide film entitled *Safe Operation of Heavy Duty Trucks.* The film, consisting of 75 slides, was recently completed and is now available for distribution. It demonstrates excellently various safe and unsafe practises in truck operation. Photographs for the films were taken at several cement and quarry member plants.

Two sound-slide films prepared by the Gypsum Association, Chicago, *Handle With Care* and *Pass the Word Around,* were also shown. The latter film, which was given a merit award in 1951 by the National Safety Council, stressed the importance that teamwork plays in bringing about plant safety. The film demonstrated how individual employees can pass safety hints around to fellow employees, thus making a safety-conscious organization. M. C. M. Pollard, chairman of the Wednesday session, maintained that these films proved to be very effective at his company's gypsum plants (National Gypsum Co., Buffalo, N. Y.); he said there was a noticeable drop in accidents following the showing of these films to the employees.

A. B. Hofteizer, safety supervisor, Laverack and Haines Inc., Buffalo, N. Y., demonstrated a personalized safety approach in the concluding cement and quarry talk entitled *Making Your Own Visual Aids.* Mr. Hofteizer claimed that an effective and inexpensive way of selling safety, which he has been using for three years, is to show slides of *your* plant, *your* employees, and *your* accident hazards at safety meetings.

The method requires only a limited amount of relatively inexpensive equipment, including a 35-mm. camera with flash bulb attachment, and various darkroom equipment and supplies. Mr. Hofteizer uses three types of film, including standard (plus X and super XX), microfilm, and direct positive. The latter film is used almost exclusively for slides, while the microfilm is used in the making of one page safety bulletns, which are placed on various bulletin boards throughout the plant.

A valuable feature of the method is the speed with which the photographs can be put into use. Photographs of unsafe practices can be taken in the morning; and slides can then be shown to the employees that same afternoon, while the scenes are still fresh in the employee's minds. To demonstrate the speed and effectiveness of the method, Mr. Hofteizer showed slides of pictures taken one hour before he gave his talk.

Regarding the subject matter of picture-taking, Mr. Hofteizer said it is important to photograph good safety practices as well as hazards, since praise of employees goes a long way in selling safety.

OTHER SECTIONS

In addition to the cement and quarry section, several talks of interest to PIT AND QUARRY readers were presented at the coal mining, mining, and metals section meetings, also held in the Hilton Hotel.

John W. Pero, producton manager of a coal company in Virginia, told how a recent U. S. Bureau of Mines accident prevention course which was attended by all of his company's superintendents, mine foremen, and section foremen, proved to be very effective in reducing the accident frequency rate. The course not only made the supervisory staff more aware of hazards but also brought about a safety-consciousness on the part of the workers.

In a discussion of cost factors in rock dusting, which is a process used in eliminating coal mine explosion hazards, E. B. Nelson, general superintendent of coal mines for the Tennessee Coal and Iron Division of U. S. Steel, pointed out that his company considers rock dusting such a vital part of the coal mining operation that it makes no attempt to justify the procedure from an economical standpoint. He stated that rock dust requirements at one of his company's newest mines are considerable, totalling six railroad cars (approximately 6,300 100-lb. bags) per week. On the basis of current production, he stated that 9 lb. of rock dust are used per ton of material mined or 17 lb. per ton of usable coal.

Mr. Nelson also described various methods of distributing rock dust in a mine, including hand methods, machines, and blasting.

Ira P. Bradley, general superintendent, C. A. Hughes and Company, Cresson, Pa., in a talk on *Responsibility of Roof Fall Accidents,* stated that roof fall accidents in coal mines, which kill or injure only a few men at a time, account for several times as many fatalities as the more publicized mine explosions. He pointed out that 25 percent of all non-fatal injuries in coal mines are the result of roof falls.

He attributed a big share of coal mining's bad safety record to two human elements, including the devil-may-care attitude of the miner resulting from a feeling that he is in an inferior industry, and the top executive who gives lip service to accident prevention.

At one of the mining sessions, James W. Brykit, Phelps Dodge Corporation, Ajo, Ariz., described an effective safety method in which company workers write their own safety rules. Safety codes are drawn up covering every phase of plant operation. In addition to bringing about safety, they serve as valuable teaching aids for new employees.

Numerous safety rules in the operation of conveyors were presented at the metals session by Jervis C. Webb, executive vice-president, Jervis B. Webb Company, Detroit, including the following: never put a conveyor into operation until it has formally been turned over by the manufacturer; adequately guard all drive machinery; keep lubrication piped to safe points; provide adequate clearances for maximum loads; consider visibility in locating controls; confine operation of conveyors to authorized employees; leave repairs to maintenance employees; and insist on no riding and no stepping on conveyors.

How Buyers and Sellers of Nonmetallic Products May Win Contract Litigations

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

IN this article I shall review the cause and outcome of several outstanding higher court law suits involving contracts for sale of nonmetallic products, knowledge of which will assist readers to avoid similar legal controversies.

The reason I have compiled these cases and written this article is that every buyer and seller of nonmetallic products is confronted daily with important legal problems. The faculty of correctly solving these legal problems frequently results in the saving of many thousands of dollars, including the payment of heavy damages, lawyer fees, and other incidental expenses, not to mention the loss of valuable time required to defend a law suit that passes through many courts. Readers will do well to clip and file away the citations which can be utilized advantageously to win unavoidable law suits.

Liability for Breach

Many law suits involving buyers and sellers of nonmetallic products arise from an alleged breach of contract. Hence, knowledge of the rights and liabilities of parties in this respect is important.

First, it is important to know the law is well established that where two parties enter into a valid contract, a breach of the contract by one party entitles the other person immediately to sue and recover damages.

Broadly speaking, if a seller fails to deliver nonmetallic products legally ordered by a purchaser, the latter may recover the profits he would have earned had the purchaser fulfilled the terms of the contract.

On the other hand, the general rule of law is that, in case the terms of the sale are breached by the seller, the buyer has several remedies among which he may choose. He may (a) affirm the contract, notwithstanding the seller's breach, and proceed to carry out his part of the agreement; (b) he may rescind the sale contract and return the products already received and recover the money already paid on the purchase price; (c) he may affirm the sale, and if he has been damaged by the breach of the contract by the seller, he may set off the amount of such damages when the seller sues for the balance of the purchase price; or (d) he may sue the seller for full damages. The purchaser must, however, elect between these various remedies and is bound by his election.

Without going into great detail illustrating breaches of contracts, it will suffice to state that if either contract party fails to comply with the *intended* meaning of the contract at the time it was signed, he is liable in damages for breach of the contract.

For illustration, in *Seitz v. Zukowski*, 215 N. W. 939, it was disclosed that the Wino Marble Company signed a written contract to construct certain work using marble.

Controversy developed when the purchaser refused to pay for the work on the contention that the Wino Monument Company had substituted chips of stone and concrete behind the slabs instead of using solid marble throughout the construction.

The counsel for the Wino Marble Company contended that the wording of the contract permitted the company to use this construction. The lower court took verbal testimony to determine the intended meaning of the contracting parties when the written contract was originally made. From this testimony the higher court decided that the company was obligated to use marble exclusively. Therefore, the higher court held the Wino Marble Company not entitled to payment, and quoted the law as follows:

"The lower court properly received evidence of what was said before the contract was signed, not for the purpose of contradicting the written contract, but to explain ambiguous terms used in the contract . . . Such evidence to enable the court to say what the parties to a contract intended to express by the language adopted".

Seller Approved Breach

Frequently unusual occasions arise under which a seller may desire to cancel a contract. Such a situation may exist, for instance, when the price of materials has increased after the contract was signed. It is certain that so long as the contract is in effect, the seller is liable in damages to the purchaser if for any reason he fails to deliver the materials at the price specified in the contract. On the other hand, if the purchaser breaches his contract, the seller may *immediately* refuse to make any further deliveries of materials. But, if the seller ignores the buyer's breach, he becomes automatically obligated to fulfill the exact terms of the original contract.

For example, in *Standish Pipe Line Company v. Oklahoma County Excise Board*, 14 Pac. (2d) 281, the testimony showed facts as follows: A board of county commissioners, under date of August 5 entered into a contract with a seller whereby the latter agreed to furnish the county a quantity of road material in the nature of rock asphalt at a specified price per ton. The contract specified that the material would be delivered within ten days after written notice of orders were received by the seller from the county engineer. The seller further agreed to furnish the material to the county at the designated price up to the following June 30.

None of the material was ordered out by the engineer until the following July 23. Hence, the county had breached its contract by failure to order out any material before the date of June 30 specified in the contract. Nevertheless, the seller delivered to the county the material ordered by the engineer on July 23. A disagreement arose, and the seller contended that his obligation under the contract had ceased on June 30.

It is interesting to note that the higher court held that as the seller had filled the delayed order of July 23, he became obligated to fulfill the *exact terms* of the *original* contract.

This same law is applicable to contractors who continue to perform work after knowing that a situation has arisen under which he may repudiate and cancel the contract.

For illustration, in *Natural Rock Asphalt Corporation v. Carter*, 297 S. W. 1114, the testimony showed facts as follows: The Natural Rock Asphalt Corporation installed a plant and equipment on its property for the purpose of quarrying and crushing rock asphalt. After producing several thousand tons of material, the company decided to let by contract certain portions of the work incident to producing, transporting, and selling the material.

As is well known, rock asphalt in its natural state is a sandstone impregnated with bitumen, or asphalt substance, and is found in deposits of varying thickness covered by varying quantities of earth and rock. It must be quarried, run through a primary crusher, and then pulverized before it is ready for use. The first step in quarrying consists in stripping the over-burden, consisting of earth, unimpregnated sandstone and lean rock, which is sandstone impregnated with bitumen, but with not sufficient quantity thereof to render the rock merchantable. The merchantable rock is then shot down with dynamite and run through a primary crusher.

The company made a contract with one Carter whereby Carter agreed to quarry, crush, and load on barges at the landing at the plant a minimum of 50,000 tons of natural rock asphalt between March 1 and December 31, in accordance with a certain schedule of monthly tonnage at a stipulated price. On June 9 Carter ceased operations under the contract and notified the company that he had abandoned it. At that time he had quarried, crushed, and delivered on barges 3,554 tons, whereas the contract provided that he should produce and deliver 1,000 tons in March; 3,000 tons in April; 6,000 tons in May; and 7,000 tons in June.

Further testimony showed that Carter began work on March 1 and continued to work until June 9 during which time he had made no complaint to anyone. When he ceased work, more than a third of the contract time had elapsed.

The company sued Carter for $200,000. Carter defended the suit and asked for damages on the contention that he had been induced to enter into the contract through a misunderstanding.

The lower court held the company liable to Carter for $5,000 damages, but the higher court reversed the decision and in holding the company entitled to recover full damages from Carter, said:

"A party who claims to have been defrauded in the execution of a contract must assert this defense within a reasonable time after a suit has been brought against him, to enforce the contract, or within a reasonable time after he has discovered the fraud, or else he will be deemed to have waived his right to rely on the alleged fraud in the execution of the contract."

In explaining the rule by which the amount of Carter's liability for damages was computed, the court said:

"The measure of damages for the breach of the contract, so far as failure to produce the material is concerned, is the difference between the price that Carter was to receive for quarrying and crushing the material and delivering it on barges and what it would reasonably have cost the company to have the same work done after Carter abandoned the contract, or what it actually cost the company to do the work, provided that it operated the plant in a reasonably prudent manner."

Law of Implied Guarantee

Modern higher courts consistently hold that under ordinary circumstances a seller "impliedly" guarantees that his product is reasonably worth the selling price and, further, that it is suitable for the purposes for which it is sold.

For instance, in *Trudgeon v. Patterson*, 299 Pac. 419, it was shown a contractor ordered from a seller 450 sacks of "bricklayers' cement". The seller delivered material which was represented to be bricklayers' cement, but which actually was "raw mix". The contractor used the material until the walls of the building were about 20 ft. high. When a rain came, the material washed out of the brick. The contractor was compelled to tear down the brick wall and take out the "raw mix" and reconstruct the wall. He sued the material man for heavy damages. In holding the material man liable, the court said:

"In the case at bar plaintiff (contractor) sought to purchase from the defendant (seller) a well known material, known as 'bricklayers' cement'. Defendant (seller) agreed to sell and furnish to plaintiff said material. It is an implied warranty that goods so furnished were suitable to perform the ordinary work for which they were intended. . . ."

Contracts Made by Employees

Considerable discussion has arisen from time to time over the legal question: "When and under what circumstances may an employee make a valid contract for his employer?"

Obviously, if a contract made by an employee is invalid, there can be no liability for an alleged breach. Therefore, very often a suit for breach of contract many be won by proof that the contract was made by an unauthorized employee and that therefore the contract is void.

On the other hand, the higher courts hold that if an employer has placed an employee in an authoritive position, the employer is liable on all contracts made by the employee which relate to the business in which the employee is employed.

Generally speaking, an ordinary employee such as a clerk, stenographer, bookkeeper, etc., is *not* empowered to bind his employer on a contract. However, if the employee, e.g., a manager or a superintendent, is authorized to transact "general business" for his employer, the court may "imply" that the other contracting party has power to compel the employer to fulfill the exact terms of the contract. The same law is applicable to modification of a contract by an employee.

For example, in *Steckel v. Cavanagh*, 140 Atl. 401, it was disclosed that a seller of sand and gravel contracted with a purchaser to furnish the necessary amount of material to be used in the construction of a road. The contract contained the following stipulation:

"We (sellers) knowing that our gravel weighs 93 pounds per cubic foot, and our sand weighs 81 pounds per cubic foot, agree to accept payment based on the above weights, measurement of batches to be agreed upon between us, this to avoid the time lost in weighing each truckload."

Later the buyer's superintendent informed the seller that for convenience the latter could bill the material by actual weight. In accordance with this agreement the seller billed the material to the purchaser by actual weight, taken from the scale tickets, which were signed by the drivers of the trucking firm engaged by the purchaser to haul the material.

The purchaser refused to pay for $4,708 worth of material, contending that the superintendent had no authority to change the terms of the written contract. However, the court held the buyer liable, saying:

"The evidence showed that the superintendent had charge of the

entire work: that he hired and discharged help; made up pay rolls, ordered repairs, and hired apparatus."

Therefore, it is quite apparent that while an ordinary employee does not possess "implied" authority to vary the terms of a contract, yet a superintendent, a manager, or any other person who has general authority may bind his employer.

Illegal Official Makes Contract

According to a late higher decision, a corporation is liable on contracts made by an illegal official, if the testimony shows that no stockholder objected to the official holding this position, and to his representing the corporation.

For example, in *Consumers' Salt Company v. Riggins*, 282, Pac. 954 it was shown that a man was elected secretary of a salt corporation by the directors of the corporation. However, these directors were not legally qualified to elect the secretary.

In subsequent litigation the higher court ousted the secretary, but held the corporation liable on all contracts made by him. This court said:

"Even if we assume that their election as directors was illegal, they were nevertheless, *de facto* directors of said corporation, and as such their acts were binding upon the corporation in all respects. Where a person not eligible to the office is declared elected, and no stockholder objects or takes legal proceedings to test the right to the office, and such person is allowed to perform the duties of his office, he becomes an officer. His acts cannot be objected to on the ground that he was not a legally elected director. Neither corporate creditors, nor the corporation, nor the stockholders, nor the director himself, are allowed to raise this objection in that manner."

Personal Liability

Another important point of law is that a corporation official or any other employee may be held personally liable for losses to his employer resulting from his failure to abide by valid laws, or if he exceeds the authority conferred on him by his employer.

For illustration, in *Bogue-Chitto Gravel Company v. Parish Lafourche*, 122 So. 505, the testimony showed facts as follows: A sand and gravel company furnished gravel to a contractor for the construction of a county highway. The sand and gravel company filed a sworn statement with the county recorder of the amount due from the contractor for gravel. Subsequently a county official paid out all moneys due the contractor to various other creditors. The gravel company sued this official *personally* to recover the amount due for the gravel. Although the lower court held the official not personally liable, the higher court reversed this verdict, saying:

"It is ordered and decreed that said Bogue-Chitto Gravel Company have judgment against defendant (official) in the sum of $304.12, with 5 percent per annum interest."

North Jersey

(From page 84)

other points where there is impact between stone and metal. Such applications, though somewhat costly, have been found to be quite effective in deadening noises.

Ballast loading from storage presented some difficulties for a while, since the stockpiles were located on the side of the company's property closest to the neighbors. This problem was solved by the simple expedient of moving the stockpiles to a new location where the loading noise would be much less likely to cause irritation. A stand of white pine trees which the company planted some years ago now serves the property as a year 'round noise breaker and barrier.

Strange as it might seem to a layman, blasting noise is not a problem at all because there is practically no noise at all associated with the primary blasts. When neighbors visit the quarry to witness a blast, as often as not they fail to realize that it has gone off until they are told. The program of noise abatement in the quarry also included the installation of Swarthout mufflers on the two steam rigs in order to subdue the chug-chug sounds associated with such equipment. Both steam cranes were converted to oil firing in order to get away from the dirt and smoke caused by coal firing.

North Jersey does a lot of little things which are individually unimportant but collectively are indispensable to its good neighbor policy. Whenever there is any choice, trucks are routed so as to stay as far as possible from the neighboring residential property. Trucks are loaded with meticulous care to prevent spilling stone on the surrounding roads and streets, and the drivers are instructed to yield the right of way to passenger cars wherever it is possible to do so. The company co-operates fully in civic projects of every description.

Because noise abatement and dust control have figured so importantly in operations at Millington, North Jersey personnel have come to refer to the establishment as the "Ideal Plant". The terminology is about as unusual among quarrymen as the whole plant itself is among quarry properties, but we think it is employed with more than just a measure of respect. In *our* book, at any rate, "the ideal plant" represents a significant achievement in the field of public relations, as well as a convincing demonstration that an all-out good neighbor policy can solve some pretty difficult problems.

New Bulletin Tells Story Of Los Angeles Air Pollution

Methods which have been found effective in reducing air pollution caused by metallurgical and mineral processing plants in Los Angeles County, Calif., since the Los Angeles Air-Pollution Control District began functioning early in 1948 are described in a Bureau of Mines report released by the United States Department of the Interior.

Although some of the plants turning out a wide variety of nonmetallic mineral products, from sand and gravel to lightweight concrete aggregates, asphalt paving mixes, ceramics and asbestos, were found to have effective dust-collecting devices, most of those visited were found to be exceeding the allowable dust limits.

A free copy of Information Circular 7627, *Control of Metallurgical and Mineral Dusts and Fumes in Los Angeles County, California*, may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

Lime Production Reached New Record High in 1950

A new high record of lime production in the United States was made in 1950, according to reports of producers to the Bureau of Mines. Sales totaled 7,478,416 short tons, 18 percent higher than in 1949, and 3 percent greater than the record output of 1948. Of the total sales 75 percent were in the form of quicklime, and 25 percent hydrated lime.

The average value of quicklime per ton increased from $10.48 in 1949 to $10.57 in 1950. Hydrated lime value increased from $12.31 in 1949 to $12.80 in 1950. The number of active plants declined from 150 to 168.

The high level of industrial activity during 1951 created an unprecedented demand for boron compounds and as a result a new production record was established for this important industrial raw material. Output reached 862,797 short tons, as compared with 647,735 short tons in 1950, according to reports of producers to the U. S. Bureau of Mines.

New Arkansas Plant Supplies Calcium Carbonate for Alumina Manufacture

another ON THE SPOT report

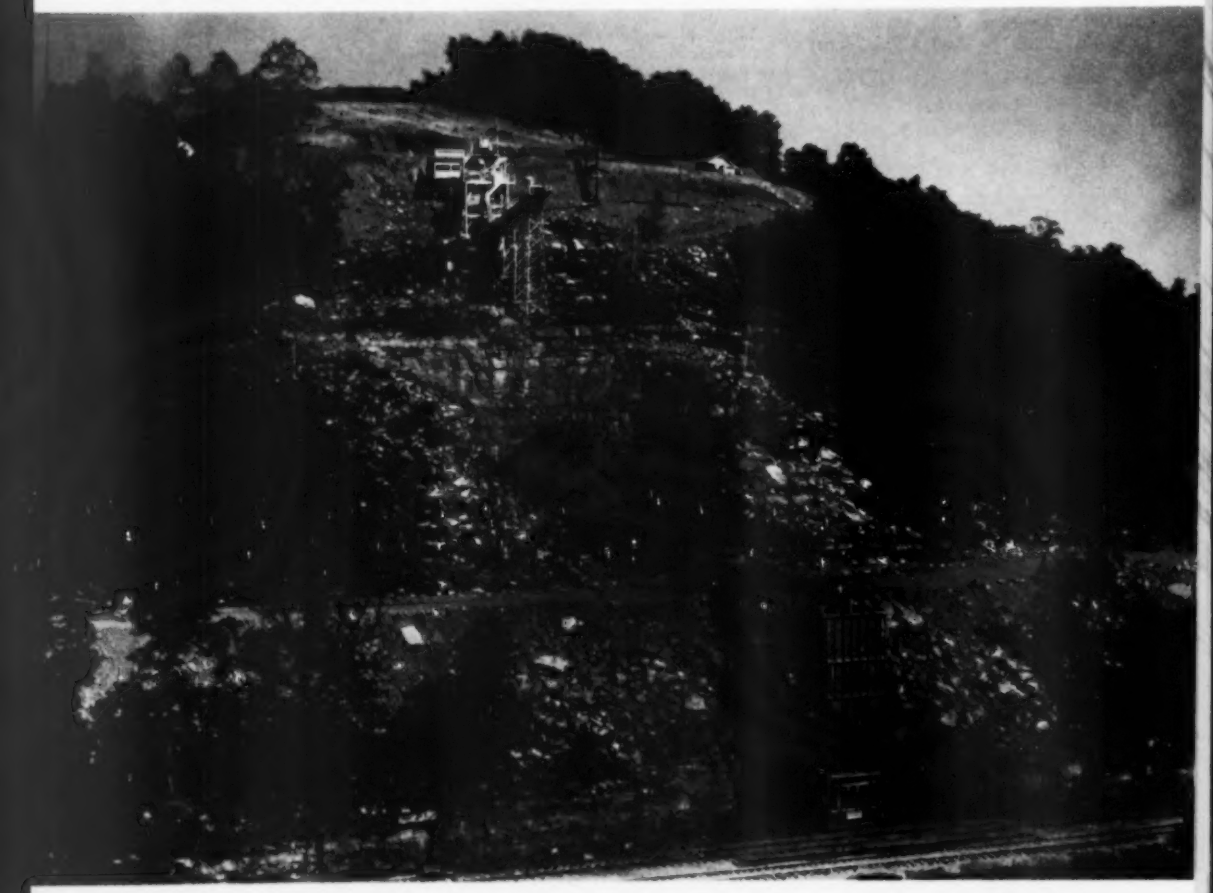
ONE of the outstanding new crushed stone plants of the year is that of the Love Hollow Limestone Company, at Love Hollow Spur, 17 miles north of Batesville, Ark. This company is a wholly-owned subsidiary of the Batesvillle White Lime Company, and the plant was built to supply up to 400,000 tons of limestone per year to the Aluminum Ore Company's new bauxite plant at Bauxite, Ark. Calcium carbonate is used with bauxite in the manufacture of the alumina from which the metal aluminum is made. The plant is on the White River and on the White River Division of the Kansas City-Memphis branch of the Missouri Pacific Railway.

By WALTER E. TRAUFFER

The quarry floor is about 420 ft. above the level of the railroads over which shipments are made, a location which called for a plant of the downhill variety. The plant went into operation on May 1, 1952, at its rated capacity of 200 t.p.h. of 6-in. minus material, which is ample to meet present needs. Maximum demand is expected to be about 1,200 tons daily. With a few minor changes the capacity of this plant can be doubled.

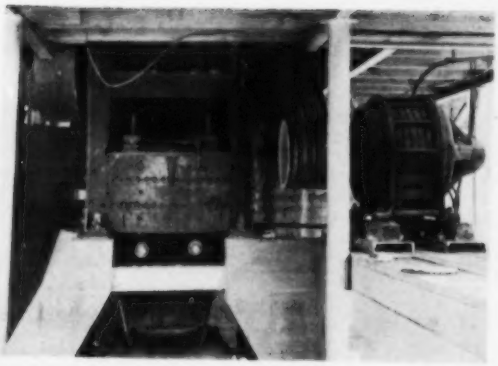
The plant is a straightline downhill operation designed to provide the maximum of output with the minimum of personnel and power consumption. It is of steel and concrete construction, and a force of 30 men takes care of all operations. It was designed by the company with the assistance of T. A. Ruddy, an engineer of the Stephens-Adamson Manufacturing Company, who has done much work for the company over a period of years.

The quarry is in the Kimswick and Ferndale strata, which average about 98.8 percent. $CaCO_3$ and to-



This view of the Love Hollow plant shows how advantage was taken of the hillside location. The quarry floor is about 420 feet above the loading tracks.

The 30- by 42-in. jaw primary crusher, with the apron feeder and the 6-in. grizzly above.



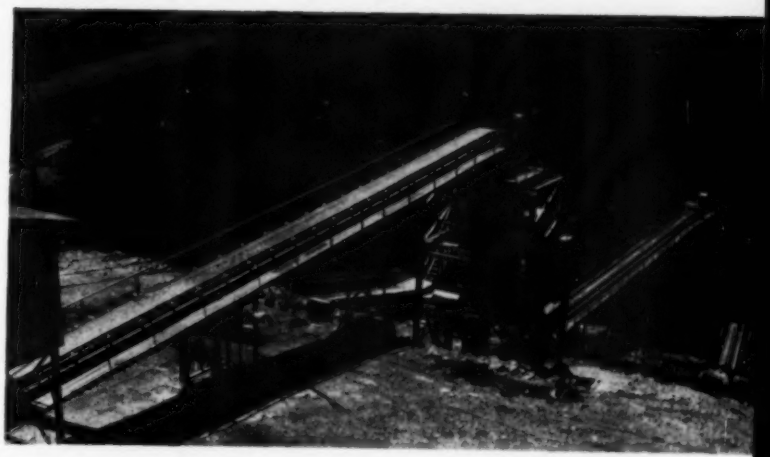
Another view of the primary crusher, which reduces rock to 6-in. minus size.

gether are about 80 ft. thick. These overlie the Plattín formation, which is about 400 ft. deep. It is not suitable for use in alumina manufacture but might be exploited later for agricultural limestone, etc.

A Lorain 820 shovel with a 1½-cu. yd. dipper loads the overburden into two Euclid 15-ton trucks—a model 64 FD and a 36 FD—both with Cummins diesel engines. The overburden is dumped over the edge of the hill into a valley, where it will not interfere with future operations.

The rock is loaded by a Northwest Model 6 diesel shovel with a 1½-cu. yd. dipper into three Koehring 5-cu. yd. Model W60 Dumptors. The haul is now about 1,000 ft., and the loads are dumped onto a 4- by 15-ft., Stephens-Adamson steel apron feeder. This discharges at a controlled rate over a 6-in. rail grizzly into the 30- by 42-in. Pioneer primary jaw crusher, which is set at 6¼in. maximum opening. The grizzly diverts about 30 percent of the rock around the crusher onto a conveyor, and this fine material cushions the fall of rock from the crusher. The 42-in. by 150-ft. belt conveyor has rubber cushion pulleys at both points to absorb the shock. This is a Stephens-Adamson conveyor with a steel truss framework which was fabricated at the plant site. The conveyor belt is 42-in. Goodyear 4-ply, with 48-oz. duck. It is driven by a 15-hp. motor through a No. 10 Saco reducer. The crusher is driven by a 150-hp. General Electric slip-ring motor through V-belts.

This conveyor discharges through a chute which is so arranged that if the stone is clean, it can be fed



The belt conveyor from the crusher to the screening station, with the stockpiling conveyor at the right.

The conveyor and the crusher building, with the truck discharge hopper above.

directly, *via* a stone ladder, on the second conveyor to storage. If the stone needs washing, it is discharged *via* a split chute onto either or both of two 4- by 12-ft. Cedarapids 2-deck screens which are equipped with sprays. These have 3-in. punched plate on the top deck and 2-in. wire cloth on the bottom deck. Usually only one screen is used and the other kept in reserve. The material over both decks—2-in. to 6-in.—is chuted onto conveyor No. 2.

The minus 2-in. material through the bottom deck of the screen goes with the water into a 4- by 18-ft. Eagle twin-screw washer. The water and dirt overflows the washer and is carried by a pipe to a waste pond. The washed rock is discharged into a box which feeds it onto the No. 2 conveyor ahead of the coarse rock to cushion its fall. This 36-in. by 175-ft. conveyor also has rubber pulleys at its feed end. It is driven by a 15-hp. motor through a No. 8 Saco reducer, V-belts, and roller chain. The screens are driven by 15-hp. G. E. motors through V-belts and the screw washer by a 25-hp. Delco motor through V-belts. This conveyor is horizontal and is supported on a structural steel framework fabricated at the site.

Conveyor No. 2 discharges at an elevation of 489.36 ft. above sea level onto the stockpile which is in a bowl-shaped cavity cut into the face of the rock cliff. At the bottom of the cavity is a reclaiming tunnel of 9-ft. dia. Armco corrugated steel tunnel pipe with its top at an elevation of 368.88 ft., about 120 ft. below the conveyor above. This stockpile will be built up to a maximum height of about 100 ft. which will give it a live reclaimable capacity of about 25,000 tons. Another 25,000 tons of dead storage can be reclaimed by means of bulldozers when desired.

The reclaiming tunnel is 140 ft. long and has six reclaiming openings in its top which are equipped with tilting-type air-ram gates. The 30-in. by 224-ft. reclaiming belt conveyor is driven by a 15-hp. motor through V-belts and a No. 8 Saco reducer. It discharges the rocks into a 125-ton bin from which cars are loaded through a drop chute gate. The car being loaded is weighed on a Howe track scale with a 71-ft. platform, so that an accurate record of all shipments can be

Stockpiled material is reclaimed onto the tunnel conveyor by six air-operated tilting gates.

Below, left: The screening station, with its twin washing screens and twin-screw washer. The stone ladder at the left permits bypassing of crushed material direct to the stockpiling conveyor. Right: The stockpiling conveyor discharges material onto the stockpile over a tunnel 120 feet below.

The stockpile has a capacity of 50,000 tons, half of which can be reclaimed through the tunnel below.

The 125-ton bin from which cars are loaded while they are on the track scale below.

kept with the least possible trouble and delay. The company built its own siding with three gravity tracks above the bin having a combined capacity for 30 empty cars. These tracks converge at the loading point, and there is space below for 30 loaded cars. The railroad provides one switch per day.

The plant electrical control system provides for automatic sequence starting and stopping. There are also three separate control stations —one at the crusher, one at the washer, and one at the reclaiming conveyor. Power is received from the Arkansas Power and Light Company at 13,000 v. and is reduced to 440 v. for all motors and 110 v. for lights.

Wash water for the plant is provided from the White River by a Fairbanks-Morse 9-stage vertical pump driven by a 150-hp. motor. This feeds the plant at the rate of 750 g.p.m. through a 6-in. line against a total head of about 250 lb. The water is pumped 1,000 ft. horizontally and 226 ft. vertically.

The officers of the Love Hollow Limestone Co. are Louis R. Myers, president; C. E. Baxter Jr., vice-president; Mrs. M. S. Stokes, treasurer; Miss Enga Wynne, secretary. J. T. Low is general superintendent and was in charge of construction of the plant.

The parent company, the Batesville White Lime Co., was formed in 1906. Its plant near Batesville was built in 1922 and has a daily capacity of 300 tons of quicklime and 1,000 tons of limestone products ranging from 200-mesh to aggregate sizes. (See PIT AND QUARRY, December, 1944, pp. 70-73.) In addition to the Love Hollow Limestone Co., there is another wholly-owned subsidiary, the Arkansas Limestone Co., which started up a 250-t.p.h. plant near Love Hollow in October, 1948.

Vermiculite Film Offered To Members of Industry

Dead load equivalent to the weight of five elephants can be eliminated in the average home with vermiculite plaster, according to *Lightweight Champion*, a new fullcolor motion picture just released by the Vermiculite Institute of Chicago.

This 20-minute sound movie gives a concise, dramatic presentation of the tremendous weight and cost savings possible with vermiculite plaster fireproofing and vermiculite acoustical plastic. When used in combination as ceiling fireproofing, these materials give high acoustical value at low cost, with an official 4-hour fire rating.

The film is suitable for meetings of building professionals and the general public, since it covers small houses, as well as multi-story structures. Portions of the movie were made at the Detroit Building Trades School, which conducts one of the nation's leading apprentice instruction programs. A speaker will be furnished gratis upon request. Apply to the Vermiculite Institute, 208 South LaSalle St., Chicago 4, Ill.

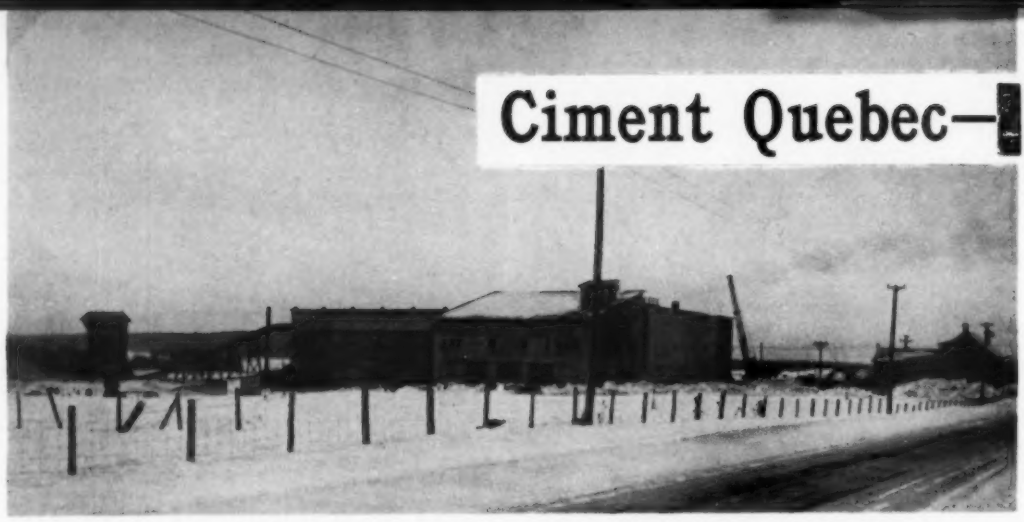
1951 Asbestos Output High But Inadequate for U. S. Needs

Domestic production of asbestos in 1951 exceeded the high record of 1949 but amounted to only 6 percent of our domestic requirements, according to reports by producers to the U. S. Bureau of Mines. Major production is in Vermont. Moderate supplies of chrysotile, some of it high quality spinning grade, were obtained in Arizona. Small sales of amphibole asbestos were reported from several states.

Imports and apparent consumption as in 1950 exceeded all previous records. Imports from Canada again attained an all-time high. Imports of low-iron chrysotile from Southern Rhodesia, however, continued to decline, a condition which has created a critical situation with respect to this type of asbestos, which is obtainable in quite limited quantities from other sources. South Africa supplied all of the amosite, and most of the crocidolite (blue asbestos) consumed in the United States.

A fire that recently swept through the Chandler Sand and Gravel Company's washing plant south of Lomita, Calif., caused an estimated $200,000 damage, according to L. H. Chandler, president and owner. He said the plant would be shut down for weeks.

Ciment Quebec—



The plant of Ciment Quebec photographed in winter. The crushing plant is at the left; the office building at the right.

another ON THE SPOT report

THE cement industry in Canada has set a new record of expansion in the last year, with three new plants and a number of important additions to existing plants. All three of these new plants are lo-

By WALTER E. TRAUFFER

cated in the eastern provinces, which formerly had to ship in their requirements—one each in Quebec, New Brunswick, and Nova Scotia. With these additions it would seem that ample supplies of cement will be available in Canada, even if the industrial and building boom continues for several more years.

The new plant in Quebec Province is that of Ciment Quebec, Inc., at St. Basile, 30 miles west of Quebec City on the north side of the St. Lawrence River. Construction of this plant was begun in 1949 and it went into operation in October, 1951, with a capacity of 900 U. S. barrels daily. A second kiln and additional finish-grinding mills now being installed will be in operation about March, 1953, raising capacity to about 1900 bbl. daily. A third kiln has been ordered; and when this is started up about June, 1953, capacity will be about 4,800 bbl. daily.

The man behind this new operation is Gustave Papillon, director-manager of the company. His father, Ernest J. Papillon, president of the company, is a broker, but the family had for many years farmed the property on which the plant and quarry are located. Lime kilns had been operated for a time during the 1890's, and when the shortage of cement became acute a few years ago, the presence of suitable stone gave Gustave Papillon the idea of building a cement plant. After drilling eight test holes 100 ft. deep to assure himself that adequate amounts of suitable stone were available, Mr. Papillon proceeded to learn all he could about the cement industry. For two years he studied all the literature available and traveled throughout the United States, studying cement plant designs and operating methods. Taking those ideas which best fitted his needs, he made a rough layout of the intended plant.

The capital for this plant was raised from 800 shareholders throughout Quebec Province, most of them concrete block and pipe manufacturers, contractors, and other large users of cement who wanted to assure themselves of a steady supply. In this way also the company assured itself of a steady outlet for a large part of its output. Officers of the company are Ernest J. Papillon, president; Fridolin Simard, president of the board; Benjamin Roy, vice-president; Alphonse Lemay, vice-president; Gustave Papillon, director-manager. Directors in addition to the above are: Ubald Tete, Louis Dussault (also legal counsel), Albert Boulet, C. A. Pratte, and Albert Bouchard. Nicholas Arkendel is chief chemist; Christian Trancon is mechanical engineer.

The design and construction of

A view of the quarry which shows the highly stratified nature of the deposit.

Canada's newest cement plant

begins operations on small scale— expansion under way

the plant were supervised by Gustave Papillon. M. M. Smith, consulting engineer of Syracuse, Ind., also remained to get operations going as chief chemist, etc. The buildings are all of reinforced concrete and steel frame construction, with concrete block walls and corrugated asbestos roofing. Only that side of the building where extensions are being made is temporarily closed in with wood framework and galvanized iron siding. Steel doors, window frames, walkways, etc., are used throughout.

When completed, the plant will have mostly new equipment. Only the two smaller kilns and a few other items were purchased used to facilitate delivery but they have been rebuilt and are regarded as equivalent to new machinery.

The No. 2 kiln is 9½ by 8½ by 200 ft. and will have an Allis- Chalmers aid-quenching cooler. The No. 3 kiln will be an 11½- by 10½- by 400-ft. Allis-Chalmers unit and will also have an air-quenching cooler of that make. The raw mill and the clinker mill, which will take care of the additional kiln capacity, will be an 8- by 41-ft. 3-Compartment Alllis-Chalmers Compebs. A slurry tank 200 ft. long by 25 ft. wide and 21 ft. deep has already been built for the added load. It will have a double-arm F. L. Smidth travelling agitator. The mill feed bins are of concrete and will be a part of a storage building 75 ft. wide by 300 ft. long which is now under construction. Raw materials, clinker, gypsum, etc., will be handled by an 8-ton Dominion Bridge Co. overhead crane with a 2½-cu. yd. clamshell bucket. The temporary cement storage silos will be replaced by six 26-ft. dia. by 90-ft. high reinforced-concrete silos.

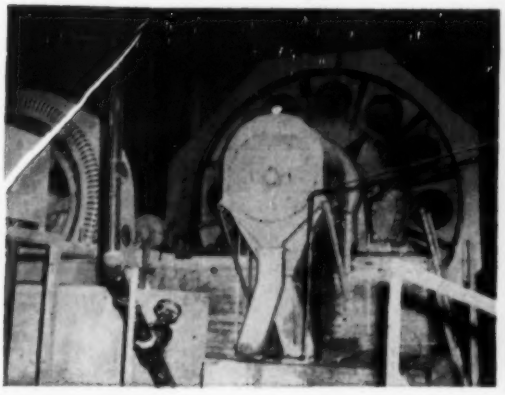
The deposit has light overburden, which is removed by a bulldozer. There are three distinct types of rock in separate layers and these are being quarried in three benches. The top 10 ft. consists of rock with 65 percent $CaCO_3$; the next 30 ft. is 75 percent $CaCO_3$; and the next 12 ft. or more is 88 percent $CaCO_3$. The rock is stratified in layers of 1 ft. or less but is not badly broken, which makes for easy drilling, excellent breakage, and a smooth quarry floor. The slight slope of the deposit provides excellent drainage to a sump at one end of the quarry.

Drilling is done with two Inger-

The crushing building, showing the secondary crusher and the conveyor to plant storage (left).

Below: A view inside the mill building, showing two of the three raw and finish mills now installed.

Right: One of the two bag packers used in this plant.



The temporary packhouse and the cement storage silos.

soll-Rand wagon drills, with a third in reserve. Loading is done with a 2-cu. yd. Lima diesel shovel and a 1-cu. yd. Bucyrus-Erie steam shovel. Four International and Reo dump trucks on a comparatively short haul keep the crushing department supplied at its capacity of 150 t.p.h. The 16-in. Telsmith gyratory primary crusher discharges to a bucket elevator feeding a bin over the two secondary crushers, a 48-in. Telsmith Gyrasphere, and a 6-in. Allis-Chalmers McCully gyratory. A 30-in. by 325-ft. belt conveyor feeds into two 350-ton plant bins for different kinds of rock. Two Schaffer Poidometers blend rock from these two bins to the 7- by 26-ft. Allis-Chalmers compel primary raw mill. This is mounted on one tire and a trunion bearing and is driven by a 500-hp. synchronous motor which gives the plant a high power factor. Two types of slurry—75 percent and 86 percent $CaCO_3$—are produced alternately and are pumped into three tanks. From these the 76.2 percent kiln feed is blended to a fourth tank ahead of the kiln feed tanks. All slurry movement is by gravity. An Eimco slurry filter has been installed but has not yet been connected into the circuit.

The No. 1 kiln is 9 ft. long by 162 ft. in dia. and is followed by a 6½- by 70-ft. rotary cooler. This raw material makes very small clinker—¼ in. and under—which cools rapidly and is easy to handle, blend, and grind. Oil is used as fuel, and consumption is now 1,300,000 B.t.u.'s per bbl. Temperature in the burning zone is 2,600 deg. F., the exit gas temperature is 700 deg., and the clinker is discharged from the cooler at 150 deg. When the filter is in operation, the slurry moisture content will be reduced from the present 38 percent to about 20 percent, with a substantial increase in fuel economy. All the usual kiln controls are used, including a Leeds-Northrup Rayotube and Micromax recorder for burning zone temperature, a recorder for the feed end, a flow meter for draft at hood, damper control, oil flow meter, etc.

The clinker is fed with 2½ percent of gypsum to the 7- by 14-ft. Marcy preliminary grinding mill. This mill is supported on two tires and is driven by a 300-hp. slip-ring motor. Finish grinding to 88 percent through 200-mesh is done by a 6- by 15-ft. Allis-Chalmers 2-compartment mill which is driven by a 250-hp. slip-ring motor. A Fuller-Kinyon pump feeds the finished cement into two 2,500-bbl. tanks in the temporary packhouse, where Darnley-Taylor packers are used. A Fuller C60 rotary compressor supplies the air for this pump. Shipments are now being made by truck, but a 1½-mi. siding is under construction to the Canadian Pacific Railway station at St. Basile.

The company owns its own transformers and in this way gets a low power rate. The present bank of transformers reduces from 66,000 to 550 v. A second bank of 4800-kv.-a. capacity will reduce from 66,000 to 2300 v.

There is a complete chemical and physical testing laboratory, and all the usual routine control tests are made. The cement produced meets all Canadian and American specifications, and is light in color.

Controlled Heat Release

(*From page 85*)

tional equipment required for the operation of this method can be made in the company's own shops at a cost chargeable to maintenance. Installation can be made during outage for refractory repairs, without loss of clinker production.

The additional output of clinker requires no additional plant labor, consequently reducing the bin cost of the total output substantially below the current cost.

Compared with operating records of three coal-burning kilns (9 by 125 ft.) with clinker coolers before conversion, their operating records after conversion to the Nagel method (see accompanying table), covering a period equivalent to two kiln years' production, showed the following average economies.

15 percent increase in clinker production per kiln hour

10 percent decrease in coal consumption per barrel of clinker

Substantially longer operating periods before refractory renewals in the clinkering zone.

Three (9 by 125 ft.) Coal Burning Kilns With Clinker Coolers
Digest of Plant Operating Reports

Operating Method	Bbl. Clinker	Tons Coal	Lb. Coal/Bbl. Clinker
Conventional	860,418	41,257	95.9 = 100%
Nagel	540,000	23,294	86.3 = 90%
Operating Method	**Kiln Hr.**	**Bbl./Kiln Hr.**	
Conventional	22,063	(37.6 to 42.0) = 39 = 100%	
Nagel	12,000	(41.4 to 48.6) = 45.0 = 115.4%	
Nagel (Jan.)	2,047	(42.3 to 48.6) = 46.04 = 118.0%	
Nagel (Feb.)	1,771	(41.8 to 48.8) = 45.1 = 115.6%	
Nagel (Mar.)	2,073	(40.9 to 47.3) = 44.17 = 113.0%	
Nagel	17,891	(40.9 to 48.8) = 45.03 = 115.4%	
Total clinker	805,708 bbl.		

Nagel-Type, Controlled-Flame, Radiant-Heat Combustion of Pulverized Coal

Time	Flame deg. F.	Clinker deg. F. to Cooler	Air deg. F.	Gas Exit deg. F.	CO_2
9:00 A	2830	2170	1765	1610	28.0%
10:00	2820	2150	810	1615	29.4%
11:00	2740	2180	885	1565	28.4%
12:00 N	2750	2170	810	1550	22.4%
1:00 P	2730	1950	765	1650	30.8%
2:00	2780	2040	820	1610	25.2%
3:00	2710	1900	665	1670	29.0%
4:00	2820	2280	860	1740	32.6%

Complex Processing Method Pays Off In Expanding Aggregates Market

Louisiana firm spares no effort to produce high output of clean material.

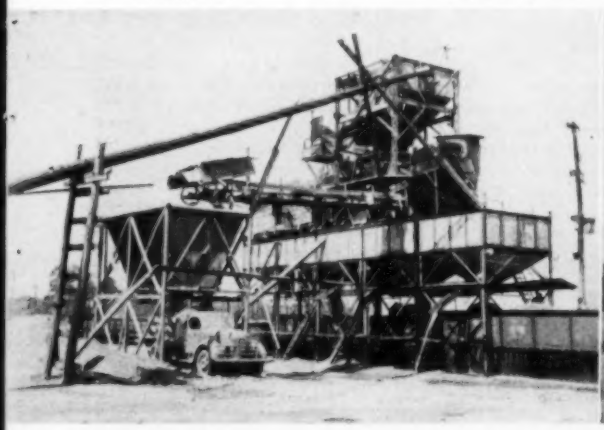
another ON THE SPOT report

IN recent years there has been much concern over the rapid depletion of the natural resources in this country, particularly the metallic ores. Comparatively little concern seems to have been felt, except within the industries, over the rapid and equally serious depletion of our nonmetallic mineral resources, aggregates in particular. In some areas sand and gravel is the only aggregate available locally and at reasonable cost, and in such areas much concern should be felt over the growing scarcity of good deposits which are accessible to markets and which can be worked economically.

The operations and history of the Dunham-Stephens Gravel Company, Inc., five miles northeast of Pollock, in central Louisiana, give some idea of what sand-and-gravel producers in some areas go through in order to provide for the needs of their territories. So many complications, handicaps, and extreme procedures are involved that it seems impossible for the operators to produce a good aggregate at a profit at the current low price levels. This plant has a capacity of about 300 t.p.h.

Briefly, the plant is located far from most of its markets and 20 miles from the nearest city, Alexandria, in a sparsely settled part of the state. In order that shipments could be made economically throughout its far-flung marketing area, a 2.7-mile railway extension had to be built to the nearest railroad, at a cost of $60,000 to the company. The deposit itself is good and extensive but it has up to 25 feet of hard clay overburden, and physical conditions are such that this must be overcast into the dredge pond, from which it must be pumped along with the sand and gravel. The material must then be pumped to a special plant to remove trash and excess sand and is then discharged back into the pond to soften the clay. It must then be re-dredged and specially processed to remove

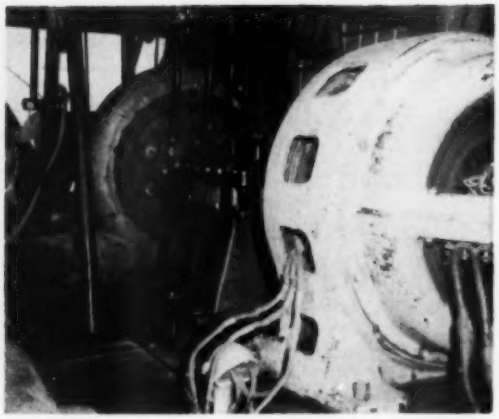
The suction dredge at the Dunham-Stephens operation, reclaiming soaked material from the dredge pond. The bank which is being worked is in the background.



This view of the plant shows the dredge line in the foreground. Sand settling tanks are in the background.

The washing tower which removes much of the sand and overburden before discharging the material into the pit for soaking.

The dredge operator at the intake hoist. (Dredge pump and motor in background.)



Right: The dredge pump has 14-in. suction and 12-in. discharge and is driven by a 500-hp. induction motor.

the clay. Only then is the sand and gravel ready for screening and classifying treatment which is ordinarily considered to be all the processing necessary. The operation is further complicated by the fact that 65 percent of the deposit is sand of which 90 percent must be wasted. This sand and the clay overburden form a serious disposal problem which was solved by building a huge disposal pond with high retaining walls. Beyond this the company is subjected only to the normal hazards of business fluctuations, labor shortages and troubles, competition, weather conditions, car shortages, rising costs and taxes, etc.

The history behind this operation is rather involved, but a general summary of it is necessary if the reader is to have a full understanding of other features. Originally the Lutesville Sand & Gravel Company established a plant near Colfax, La., before the war. In 1944 O. R. Stephens and several associates took over and moved the plant to a site not far from the present location. The company name was changed to the La Salle Materials Company, Inc. In 1949 Mr. Stephens bought out the others and became sole owner. Ted F. Dunham Jr. entered the picture in 1950, when, early in that year, he started up a new ready-mixed concrete plant in Shreveport, La. For various reasons he found it advisable to get his own source of aggregate supply, and on July 1, 1950, he closed a deal through which he got a two-thirds interest in the gravel company. The present company name was then adopted.

The then existing operation worked a hillside deposit from which a dragline and trucks fed the material to a sump at the plant. The material was then pumped out, screened, and crushed. Capacity was about 40 cars daily, and the material had to be hauled about 3 miles to a railroad for shipment. Because the plant was old and had become further run down during a 3-months strike and for other reasons, it was decided to build the new plant a quarter of a mile away but on the same leased property. Construction of the plant and the 2.7-mile extension to the Missouri Pacific Ry. was begun at once, the heavy fill necessary for the latter making it an expensive proposition.

The deposit is irregular, both in content and in depth and it is in hilly terrain, with heavy overburden; but it was selected because of its unusual extent, because of the unusually high percentage of large gravel for this area, and because of the soundness and cleanness of the material. Back in the 1920's someone had operated a small gravel plant at this location and had developed a pit about 2 acres in area where the overburden was lightest. This pit had become filled with water; so when operations started, the dredge was set up in this pond.

This original pond was on the opposite side of the plant and tracks from the present workings. Because of the low gravel content at this location the pond was cut across the tracks and the present pond was developed. The overburden there varies from 10 to 25 ft. in thickness. The deposit averages 26 ft. in depth and averages 35 percent gravel from ¼-in. up. Dredging is done to a depth of 18 ft. below water level. It is estimated that there is enough material at this location to operate the plant for 20 years.

The original pond has been converted into a settling basin for the waste sand, the clay overburden, etc. A levee and spillway was built across it. The waste from the plant is discharged in the upstream end, and the clear water overflows into a lower pond which is the source of wash water for the plant. As the silt fills in the upper pond—it is already 22 ft. deep—draglines and a tractor-bulldozer on the levee haul up material to build the levee higher. Water also enters the pond from two creeks. A 6-in. pump supplies wash water to the plant.

The overburden at the present workings consists mainly of clay which is so hard in places that blasting is occasionally necessary. At first this was loaded into trucks and hauled away but the terrain is such that it would have to be rehandled again as operations expanded. For this reason it was decided to overcast the overburden into the pond, excavate it with the sand and gravel and remove it in the plant. Two draglines—a Bucyrus-Erie with a 1-cu. yd. Yaun bucket and a Northwest 25 with a 1-cu. yd. Hendrix bucket—are on the edge of the pond and excavate the overburden in a sloping bank down to the surface of the deposit which is above water level. This system also eliminates any danger from bank caveins. When not needed there, one or both of the draglines can be used for stockpiling, rehandling, carloading at the plant, etc.

The dredge is mounted on railway oil tanks and has a 45-ft. suction line of Gates hose with an Eagle Swintek screen nozzle ladder from which the chain has been removed because it is not needed at this location. Two high-pressure

The switch point where the pipe line from the dredge can feed either to the plant (background) or to the pipe to the washing tower (right).

Another view of the plant, showing the washing tower (right). The main flume to the settling pond is at the left.

water jets are played on the bank to loosen up the material. Water for these jets is supplied by a 4-in., 4-stage Goulds centrifugal pump driven by a 40-hp. motor. The Amsco "Counterflow" dredge pump has a 14-in. suction and 12-in. discharge and is direct-driven by a 500-hp., 2300-v. Westinghouse induction motor. Other equipment on the dredge includes a hoist for the nozzle, two side winches to deadmen on the shore for moving the dredge, and a sealing water pump —all electric motor driven. The 12-in. dredge line to shore is supported on oil-barrel pontoons. Electric current is supplied to the dredge through a Simplex-Tirex Selenium Neoprene Armor power cable.

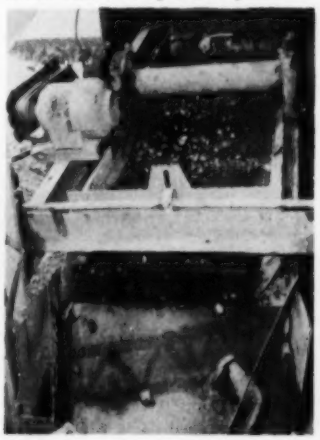
The dredge works up against the bank and pumps out both overburden and deposit. At first all this material was fed direct to the main plant, but because of the excessive amount of sand to be wasted and the difficulty of cleaning the material, the output was low in spite of a large crew and long hours of operation. This problem was solved by installing a desanding tower near the plant. The excess sand and any trash is screened out and flumed to a worked-out section of the pond. The gravel is flumed into the pond to soak the hard clay.

The dredge operates for 14 hours overnight at the bank feeding to the washing tower, building up a supply of material for the plant. In the morning the dredge is moved over to the underwater stockpile, a procedure which takes about an hour, and for 8 hours it feeds material from that stockpile to the plant. In the evening the dredge is moved back to the bank. The dredge is also operated week-ends at the bank in order to keep the plant supplied. With this soaking and double washing there has been no difficulty in getting high output of clean aggregates. Capacity is now about 50 cars or 2,500 tons in an 8-hr. day. This includes about 130 tons per day of 1½- to 3-in. gravel and considerable amounts of 1½-in. gravel.

The dredge line is equipped with Gates rubber sleeves, and the movable section has Black Bros. No. 2 chain clamps. The distance from the present working face to the bank is about 600 ft. There a junction point provides for feed to either of two lines—one 250 ft. long to the washing plant, and the other 150 ft. long to the main plant. In each case the vertical lift is about

The waste pond (background), with the levee and spillway (right) which overflows clear water to the lower pond.

One of the two 4- by 12-ft. 3-deck vibrating screens which do all gravel sizing.



12 ft. One section of the line from the dredge can be quickly disconnected at one end and switched over to the other line when changing operations. This is done by loosening the clamp, sliding back the hose, sliding over the end of the pipe, sliding the hose onto the other pipe, and reclamping. This procedure takes about 15 minutes.

It is planned to build a new dredge with a 10-in. Amsco pump so that the old dredge can remain at the bank and the new one can be used for rehandling and for work at another bank. This will provide 24-hr. per day feed from the bank and will further increase capacity by reducing the amount of fluctuation in gradation of material coming to the plant, a condition which is at present holding down output.

The dredge line to the wooden washing tower rises vertically and discharges into a metal-lined splash box. The ¼-in. wire cloth gravity screen is inclined just enough so that an ample amount of fines will remain in the gravel as it is flumed back into the pond. The minus-in. material, including most of the sand, is flumed in the other direction to the settling pond. The material wasted is about 75 percent overburden and includes about 90 percent of the sand.

The reclaiming dredge line to the plant is inclined and discharges into a splash box from which the material flows over a 12-ft. wide by 16-ft. long gravity screen. This has ¼-in. Ludlow-Saylor Superalloy wire cloth which, according to Superintendent E. F. McCarty, lasts three times as long as the ordinary steel wire cloth formerly used. It actually wears to paper thinness before breaking. Both screens have washing sprays and the water goes into a ditch back to the pond. The plus ¼-in. material is split to a pair of 4- by 12-ft. Allis-Chalmers 3-deck screens. These have wire cloth with ¼- to 2½-in. openings depending on the types and combinations of gravel being produced. Sometimes different products are made on each screen.

Usually four different gravel sizes are made at one time, and three of these are discharged by gravity into three of five 40-cu. yd. steel bins over a loading track. The fourth size is carried on an 18-in. by 40-ft. horizontal belt conveyor to a 30-cu. yd. bin over a second track.

The sand through the ¼-in. bottom decks of the screens is flumed to a series of three 8- by 12-ft. settling boxes. Over each of the first two boxes is wire cloth—usually ¼-in.—which passes on enough fine material so that concrete sand will be made in each box. When masonry sand is desired, ⅛-in. cloth is used over one box. Each box has a capacity of 25 cu. yd. and discharges into a separate bin for car or truck loading. The overflow from the boxes goes through a 130-ft. flume into the waste pond. Railroad cars are loaded under all bins through clamshell or slide gates, and trucks are loaded through side gates.

The company owns an American oil-burning steam locomotive which does all car moving and switching; the railroad company allows the switching charge. Other equipment includes an International TD 14 tractor-bulldozer, a ½-cu. yd. Quickway truck-mounted crane for truck loading, two dump trucks, etc. A total of 22 men are employed, including the extra shift on the dredge and washing tower.

The company's marketing area ranges from the Mississippi River on the east, to northwest as far as Shreveport and southwest as far as Lake Charles. At present an order is being filled for 123,000 tons of gravel and 97,000 tons of sand for the Morganza Floodway Project at Morganza, La. Large quantities of aggregates are also being supplied for air force bases at Alexandria and Lake Charles, to the state highway department, etc. This plant, of course, also supplies materials to several affiliated companies and others producing ready-mixed concrete, concrete pipe, etc.

Officers of the Dunham-Stephens Gravel Co., Inc., are O. R. Stephens, president; George Covert and Ashton Fenet, vice-presidents; and Ted F. Dunham Jr., secretary-treasurer. J. N. Miller is office manager, and E. F. McCarty is plant superintendent.

Mr. Dunham, although only in the middle forties, has had a long, varied, and highly successful career, having for the last 25 years operated ready-mixed concrete, concrete pipe, limestone, gypsum, asphalt, aggregates, clay brick, lumber, steel products, machinery, oil well drilling, cattle ranch, and even ice and ice cream businesses.

American Motor Transport Is Hero of Fruehauf Movie

A new movie featuring the motor transport industry is now available for general distribution through state trucking associations and branch factories of the Fruehauf Trailer Company.

The film, *The McGurk Way*, had a Hollywood-style premiere at the 19th annual convention of the American Trucking Associations held at the Waldorf-Astoria Hotel in New York City October 6 to October 10. The history of American transportation and its problems through four generations of the McGurk family furnishes the plot, from Conestoga wagons in Colonial days, to 1952.

Successful Rotary Drilling Of Oil Shale Told in Bulletin

Experience gained during operation in the experimental oil-shale mine at Rifle, Colo., of a hydraulically-operated drill designed by U. S. Bureau of Mines engineers has shown that rotary drilling of vertical blast holes in oil shale is less expensive than percussion drilling, according to a Bureau of Mines report.

It had been felt for some time that rotary drilling would have definite advantages in drilling oil shale if a suitable drill could be developed.

Using an available tractor as a mount, Bureau engineers designed a hydraulically-operated, drill which permitted speed, torque, and thrust to be varied widely. Details of the construction of the drill are given in the report.

The authors of the report—Fred D. Wright, Bureau mining engineer, and Lewis H. Brakel, Bureau mechanical engineer—predict that similar savings will be experienced in horizontal drilling. Although the drill was designed as a research rather than a production tool, they observe that many of its features could be incorporated in a commercial multiple drill rig.

A free copy of Report of Investigations 4864, *Development of a Rotary Test Drill*, may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh, Pa.

Japan's Cement Production Reaches All Time High

Cement production of 651,893 tons in May, 1952, marked an all-time high record according to reports from the Japan Cement Association.

Much of the increase was the result of the expansion facilities which took place after the start of the Korean trouble. The number of kilns was increased from 74 to 85 with a corresponding increase in output. Recent sales have been unsteady in the export field due partly to weather conditions and to sterling restrictions. However, the association expects the cement market to continue to increase.

The Century Cement Manufacturing Company, Inc., Rosendale, N. Y., has recently published an interesting 30-page booklet entitled *The Development of Cement*, which honors the company's centennial of cement manufacturing. The report features numerous photographs tracing the development of the natural cement industry in the Rosendale area.

Report on Current Labor Developments

By S. HERBERT UNTERBERGER

S. Herbert Unterberger & Co.
Industrial & Labor Economists
Washington, D. C.—Philadelphia, Pa.

Labor Under the Republicans

another P and Q exclusive

THE labor movement did everything it could to prevent the election of General Eisenhower. Yet, it is unlikely to suffer any direct reprisals from the Eisenhower administration or from the Republican leadership in Congress. Eisenhower has promised to be fair, and Taft, despite the labels which enraged union leaders have tried to pin on him, has been a moderating influence in labor matters.

Unfortunately, the labor movement and its leaders distrust the new administration. Despite 20 consecutive years of organization building under a benevolent administration, the labor unions still feel insecure. Many of the largest unions have had no experience in living with a neutral administration. The recent death of Philip Murray, and the resulting struggle for power within the CIO have only intensified the insecurity.

Fortunately, no clash between labor and industry which may involve the government is likely to occur in the near future since none of the contracts involving key industries is due to expire soon, except perhaps in the railroad industry, where strikes can be postponed. It would be unrealistic to expect that no clash will ever occur. The principal dangers are (1) that labor may feel that since it is on the defensive, it must make a show of force; (2) that industry may feel that since it has a friendly government in Washington, it will be aided in resisting even reasonable demands; and (3) that government may lack experience in the handling of these immensely powerful forces.

Little Labor Legislation Expected

When the new Congress convenes, it is expected that many bills for the regulation of labor unions will be introduced. It is likely that many of the measures will try to undo the last 20 years of social legislation. Extremists are already drafting such legislation. It is also expected that few, if any, of these measures will pass.

It would be no surprise if the first session of Congress ended with no amendments to the Taft-Hartley Act, at all. However, if that Act is amended, it will probably be along the lines suggested previously by Senator Taft. His amendments would make the Act more liberal and more workable, rather than more restrictive.

Among these amendments would be a change in the provision in the present law, admitted by Senator Taft to be unfair, whereby strikers who have been replaced are not permitted to vote in representation elections. This has been pointed to as a "union-busting" provision, since it permits an employer to refuse a union's demands, thus forcing a strike. Non-union replacements would be expected to vote against the union and thereby the employer would rid himself of the union. Senator Taft has introduced an amendment which would again permit economic strikers—that is, those who struck to secure better wages or working conditions as distinguished from non-economic strikers who struck over others issues such as the union shop—to continue to vote in union elections.

Another change suggested by Senator Taft deals with the boards set up in emergency disputes. The present law requires such boards to report on the facts of the dispute but prevents them from recommending terms of settlement. Since they are prevented from making constructive suggestions, those boards frequently accomplished nothing. If the Act is amended, it is likely that they will be given the power to make recommendations.

When the Taft-Hartley Act was considered originally, there was a great deal of pressure to outlaw industry-wide bargaining. This was not supported by all employer groups. Some of them, particularly in the maritime industry, felt that such a measure would seriously upset long established relationships. The attempt was resisted by the more moderate members of Congress because it was regarded as a serious invasion of freedom of contract and because it was difficult to develop a workable concept of the industry-wide bargaining which was so anti-social as to be repressed.

Nevertheless, if strikes covering entire industries are threatened or called, the demand for such legislation may become irresistible.

New Kind of Administration

The principal change is likely to be in the administration and effectuation of the laws on the books and the programs in operation. For example, a Republican Secretary of Labor is likely to be more sympathetic to the business viewpoint that the Walsh-Healey Act, under which the Secretary of Labor sets higher minimum wages for government contractors than are required under the general minimum wage laws, is unnecessary and duplicative. In the past when a labor union asked the Secretary of Labor to make a Walsh-Healey minimum wage determination in a particular industry, he generally started such a proceeding. In the next four years, at least, it will probably be necessary to show that there is a special problem in the industry which the regular minimum wage legislation fails to solve, and fewer Walsh-Healey proceedings may be expected.

Similarly, the National Labor Relations Board under a Republican Administration is likely to administer the labor law in a more limited fashion. The basic rights which the law guarantees to labor, such as the right to organize without employer interference, will probably not be altered, but a great deal of the special privileges read into the law and developed through years of enforcing it on behalf of labor will probably be eliminated. This will not occur by any dramatic rewriting of the law, or wholesale repeal of regulations under it, or total reversal of previous decisions. Rather, it will occur slowly and gradually, and will be observable only through the general tenor of new decisions.

Finally, Eisenhower has gone on record in favor of keeping labor problems out of Washington and Washington out of labor problems. He is in favor of strengthening the Mediation Service and of giving it a bigger role. He hopes that employers and unions will work out their own settlement terms. In this respect his position is really not different from that of his predecessors in office and of his opponent in the recent election. Nobody in Washington really wanted to settle labor problems. They are political dynamite. Too many people have stubbed their toes on them. The difficulty is that when the nation's

(*Continued on page* 108)

Check Your Replacement Reserves Each Year

By HAROLD J. ASHE

DO you have reserves with which to replace machinery and equipment, office fixtures, trucks, buildings and other business property that is wearing out? If so, is the amount of the reserves sufficient to replace such depreciating assets when they become obsolete and require replacement?

Some smaller operators of marginal plants maintain no reserve whatsoever for replacements. True, they may take depreciation on all depreciable assets and, to this extent, they benefit by decreased income tax charges. But beyond this they fail to go.

They do not actually set aside amounts equivalent to the annual depreciation write-off for eventual replacement requirements. Such write-offs sometimes are diverted to other immediate, and sometimes pressing, business needs. More often, depreciation charges are treated, in fact, as a sort of annual jack-pot bonus. Such funds are transferred to the owner's personal account as additional net earnings.

Larger plants and corporate ventures, of course, do not make such elementary blunders. However, they are apt to err in another direction. Too often they fall into the error of *underestimating replacement costs.* When management does, it is bound to come up short when replacement needs become imperative and can no longer be postponed economically.

A very large part of a plant's total investment is likely to be tied up in depreciating assets. This underscores the need for carefully considering replacement reserves as a means of conserving and protecting capital investment.

While probably every plant manager is aware of the fact that price tags have been marked up sharply over those prevailing pre-war, or even the first years after the war, this knowledge is rarely reflected in a realistic reserve fund designed adequately to take care of machinery and other replacements.

For example, a plant might have been started in 1941 with new or practically new equipment costing $100,000. Even if the owner maintains a reserve based on original cost of such equipment, he may find that by the time this equipment is fully written off he will be $40,000 to $60,000 or more short of having enough in the reserve fund with which to replace fully the obsolete equipment and be on the same basis, in terms of physical assets, as in 1941.

While, for purpose of filing an income tax return, the owner must report his profits by depreciating equipment on the basis of *original cost,* it does not follow that this conventional accounting method will provide him with the ultimate *replacement cost.*

This circumstance is emphasized in periods of mounting prices. If the plant management wishes to keep its original investment unimpaired, it will be obliged to set aside additional amounts to take care of inflated replacement costs.

These sums must come out of profits or what ownership may think of as profits. In fact, real profits are less than those reported in the tax return, when rising replacement costs are considered.

Thus, when a plant owner starts setting aside additional funds for replacement costs, he comes in for a rude shock. For example, after deducting the year's depreciation — based solely on original cost — together with all other business expenses, a sole owner may show a net profit of $20,000 in his income tax return. This is the amount on which he must calculate his income tax.

In past years he may have felt safe in appropriating all such profit, after taxes, for his personal needs. Now, estimating replacement costs, he discovers he must set aside, say, $5,000 more a year for replacements than the annual depreciation write-off in the tax return.

This simply means, then, that on a reported income of $20,000, as determined by depreciation charges based on cost, he has only $15,000 available for himself. And, out of this $15,000 he must pay an income tax on $20,000.

The paramount fact to keep in mind when considering depreciating equipment and other assets is this: all equipment, machinery, trucks, buildings and other depreciating items are being sold piecemeal to the owner's customers. The cost of this piecemeal use by customers must be recovered in price quotations. Otherwise, the owner is giving away his capital bit by bit, even though this attrition is not visible to casual examination.

The plant owner, eventually, must face the necessity of replacing equipment at higher price levels. (Compare pre-war and present truck costs, if this is doubted.) Using the conventional write-off at original cost, and using only this cost as part of the overall cost of doing business, the owner will come up short when the day of reckoning arrives.

He must provide additional reserves — and treat such charges as part of the real cost of doing business (except for income tax purposes, where original cost must be observed). Otherwise he, in fact, is selling his depreciating assets over the years, and day by day, at *former costs,* rather than at present or future costs.

The owner, for his own economic salvation, must make one of two hard choices. His prices must be adjusted to reflect all of the costs of doing business, including additional charge-offs for replacement reserves; or, he must content himself with a smaller net profit than, in the past, he has misled himself to believe his business is earning.

Because the life of typical depreciating items is spread over a considerable number of years, it is difficult quickly to grasp what is happening. Just as wear and tear on equipment is gradual, so, too, is the price rise gradual on replacements.

The owner is not likely to observe this slow price rise on depreciable items because he does not immediately need major replacements. It is only at the end of a 5-, 10-, or 20-year period when certain equipment and machinery needs replacement that he seriously looks at price tags again — usually with shocked disbelief.

What Happens to Replacement Reserves
(Assuming a 15-year average life, and 75 percent price increase)

Beginning of	Unrecovered Cost	Reserves Based on Cost	Combined Unrecovered Cost and Reserves	Replacement Cost	Reserves Deficiency
1st year	$150,000	None	$150,000	$150,000	None
2nd "	140,000	$ 10,000	150,000	157,500	$ 7,500
3rd "	130,000	20,000	150,000	165,000	15,000
4th "	120,000	30,000	150,000	172,500	22,500
5th "	110,000	40,000	150,000	180,000	30,000
6th "	100,000	50,000	150,000	187,500	37,500
7th "	90,000	60,000	150,000	195,000	45,000
8th "	80,000	70,000	150,000	202,500	52,500
9th "	70,000	80,000	150,000	210,000	60,000
10th "	60,000	90,000	150,000	217,500	67,500
11th "	50,000	100,000	150,000	225,000	75,000
12th "	40,000	110,000	150,000	232,500	82,500
13th "	30,000	120,000	150,000	240,000	90,000
14th "	20,000	130,000	150,000	247,500	97,500
15th "	10,000	140,000	150,000	255,000	105,000
16th "	None	150,000	150,000	262,500	112,500

Note: The 15-year average life is arbitrary. The composite life of all equipment, machinery, trucks, etc., may vary greatly.

If he has not foreseen realistically his replacement needs, such a plant owner may experience insurmountable difficulties trying to get these replacements solely, or largely, out of his current earnings. This circumstance explains largely the tragedy that overwhelms many smaller plants unable to modernize, and profitless unless they do.

Let's take a look at a typical situation showing how reserves based solely on cost fail to meet replacement needs in a period of constantly rising costs.

First, let's assume, for the sake of example, that the overall average useful life of all depreciating fixtures, machinery and equipment is 15 years. Let us also assume, and only for purposes of illustration, that the over-all price rise in a 15-year period is 75 percent on such replacement items. (See accompanying table.)

Even though a given piece of machinery may not experience a constant, even rise, percentage-wise, of 5 percent or even 1 percent each year, it is not safe to assume, under present conditions, that no rise will occur over an extended period of years. All available evidence points to a contrary conclusion.

In a period of constantly rising prices, it is unwise to count on a decline in prices timed by happy coincidence with the need for replacements. There is nothing now on the economic horizon to warrant such wishful thinking.

Suppliers are victims of the same economic trends as their customers. Labor costs are still rising, as is the cost of component parts going into the finished machinery and equipment. Taxes of all kinds are mounting sharply, and the end is not in sight.

If a plant owner wants to provide a margin of safety and protect his business against a gradual decline in its real value, he must resolve to build up adequate property replacement reserves which will take care of any foreseeable eventuality. To fail to do so invites almost inevitable disaster.

Where the owner fails to set aside enough in a reserve fund to take care of future replacements he is, to that extent, robbing his capital for his personal needs. He is giving himself the illusion of greater present net profits than the facts indicate. He is living off his own financial fat and, eventually, he must experience lean times for his shortsightedness.

At least once a year, he should carefully analyze his replacement reserve account to see if the fund needs augmenting in the light of rising replacement costs. Even where he has been making allowance in the past for rising prices, this allowance may prove insufficient if replacement costs take another spurt upward during the year.

That is, if his original reserve plans contemplate a 25 percent rise in costs, his reserves will be insufficient if, subsequently, replacement costs rise 35 percent, then 40 percent, and finally 50 percent.

This changing situation calls for vigilance. But vigilance is a small price to pay for protecting a plant against decline and its terminal product — failure.

Natl. Gypsum Sales, Earnings Rise in 9-Month Period

Spokesmen of the National Gypsum Company reported increased sales and earnings in the nine months ended September 30, as compared with the similar period of 1951.

Net income totaled $5,481,292, or $2.19 a common share, compared with $5,489,978, or $2.36 a share on a smaller number of shares in the nine months ended September 30, 1951. Sales increased to $72,558,485 in the recent nine-month period from $70,912,673 a year ago.

"Activity in building construction is currently running at a higher rate than last year and is expected to continue at this high level through the fourth quarter," Chairman Melvin H. Baker wrote to stockholders.

"The effect of increase in wages without corresponding increase in prices has resulted in lower profit margins than for last year," he added.

New Textbook on Geology Presents Fresh Approach

Geology is the simple title of a newly-published textbook authored by O.D. von Engeln, Cornell University, and Kenneth E. Caster, University of Cincinnati. In its treatment, the book consistently attempts to relate the field of geology with "the broader field of life". Planned on the educational principle of proceeding from the known to the unknown, this text presents the sequence of past events retrogressively, from the present into the ice ages and thence by stages to the more and more remote geologic past.

Among the mass of data on the geologic history of our world, present-day advances are not slighted. Recent developments such as discussions on groundwater temperature, granitization, and radio-carbon age determinations are included.

By means of a new series of paleographic maps of North America for all geologic periods the presentation of paleontology is made unusually interesting and understandable. Excellently illustrated with sketches, drawings and photographs, and written in a not-too-technical style, *Geology* appeals to both the student and the casual reader.

Publisher, McGraw-Hill Book Company, Inc., New York. 730 pages. Clothbound. Price, $7.00.

The Smith-Douglass Company of New York has recently acquired more than 98 percent of the outstanding stock of Coronet Phosphate Company, according to Ralph B. Douglass, president. No changes are contemplated in Coronet's management and customer relations. Coronet has extensive reserves of high-grade rock phosphate in Florida and operates two plants in that state.

Hard-Facing Doubles Hammer Life At California Slate Plant

• The slate mill of the Pacific Minerals Company near Placerville, Calif., which produces granules and slate flour for roofing manufacturers and other industries in the West.

MORE THAN ON THE SPOT REPORT

PACIFIC Minerals Company operates a slate mine and granules-processing plant on the south fork of the American River near Placerville, Calif. The dense, blue-black slate is mined by the room-and-pillar method, along with some shrinkage stoping.

Granules, largely in the No. 8 gradation, are sold to the major roofing makers in the West; slate flour, ranging in fineness to 325-mesh, is marketed to diverse industries as a filler. No dimension slate is produced.

Trains of 1-ton mine cars bring the slate to the plant for inital crushing in a Williams Jumbo hammer-mill, followed by another Williams mill for secondary reduction of the granules. Sizing is done by four Hum-mer screens. A Hendy ball-mill, with Sturtevant air-separators in closed circuit, grinds the flour from the screen throughs. Granules are trucked to railhead in bulk, while the flour is bagged before shipment.

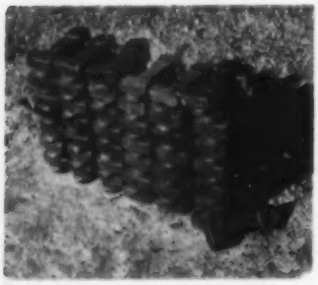
The highly-abrasive slate has always been hard on the processing equipment, particularly on the hammers of the crushers. A set of hammers would seldom last long enough to handle 1,000 tons of production before the mill would have to be torn down and the worn parts replaced. Early this year it was decided to hard-face the hammer heads, and Mirocol No. 1 rod was selected to do the job because of its known high resistance to abrasion, plus good protection against impact. Assisted by one of the field engineers of Mirocol Alloy Company of Los Angeles, a thin overlay of the cast alloy rod was applied to the secondary mill hammers by electric arc welding. The mill was then again placed in service.

According to Superintendent George H. Bishop, the hard-faced hammers lasted more than twice as long as was formerly the case, over 2,200 tons of production having been recorded before the mill again required attention. A study of the wear points on the hammers enabled the management to revise the application technique the second time so that even longer operation is now anticipated before the hammers will require another deposit of the hard material. The primary mill will receive similar treatment.

Instead of the conventional rounded-head hammers, the company is now having square-head hammers manufactured, round-heads being applied with Mirocol No. 1 rod by welding at the plant before the new hammers are installed. From the knowledge already gained, the hammers of this new design are expected to last almost indefinitely, thanks to the hard-facing on the heads.

Except for the slate operations, the area near the mine and plant is now almost deserted. This wasn't the case a century ago. The river canyon, known as Chile Bar, then teemed with the activities of 5,000 gold miners, who took untold millions of dollars worth of the precious metal from the river sands of the Mother Lode.

Main offices of Pacific Minerals are located in Richmond, Calif., where C. S. Renwick, president, maintains his headquarters.



• The new type of mill hammers which will have hard-faced rounded heads built up by welding before they are placed in service.

Labor Developments

(*From page* 105)

safety or health is threatened, the government in power finds that it is compelled to take action. It is likely that the same reasons which impelled previous governments to step into a labor dispute which creates a national emergency will also require an Eisenhower government to step in. As a matter of fact, failure to take action when required, in deference to a campaign promise, could be dangerous, indeed.

The National Council of Private Motor Truck Owners, Inc., will hold its 14th Annual Meeting on January 22-23, 1953, at the Statler Hotel in Detroit, according to T. A. Drescher, president.

• The secondary hammermill in the granules department. Hammers now last twice as long as formerly, after being hard-faced with abrasion-resistant alloy.

THE MODERN BUS & TRUCK

Fuels and Lubricants Part II*

By P. A. Binda
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The Texas Company
New York, N. Y.

MOTOR OILS

A half century ago little attention was given to the problems of lubrication in automotive engines. Many controversial thoughts existed with regard to the best way to provide lubrication but not much consideration was given to the quality of the engine oil to be used. Changing the crankcase oil was rarely done since crankcase deposit problems were nonexistent. This was due mainly to the high oil consumption rates which prevailed in those days and cooler-running crankcases because of their massiveness in relation to power output.

As engine design improved, more severe operating conditions were imposed on the oil; then the importance of lubrication became evident. Until twenty years ago straight mineral oils were used almost exclusively as motor oils, and the only characteristics that seemed to be of importance were viscosity and carbon residue. Shortly thereafter, however, the trend in design and performance of automotive engines showed rapid increases in compression ratio and speed; then higher power outputs resulted, while engine size remained the same or in some cases even was reduced. Concurrently the high speed diesel engine was introduced to the automotive field.

These developments presented many metallurgical and lubrication problems. The oil industry quickly took the lead, along with some engine builders, to develop motor oils to meet the more exacting engine demands. Since the inception of research and development work on motor oils, a vast background of knowledge on engine lubrication has been gained and has been frankly discussed in technical publications. Typical of this is the January, 1952, issue of *Lubrication* on "Modern Motor Oils."

Motor Oil Types A considerable variety of motor oils were developed as a result of this trend. The differences among the various types available are of interest. Previous to 1945 oils were classified by the SAE number only, with respect to viscosity. In February, 1947 the SAE approved the use of the following nomenclature as set forth by the American Petroleum Institute through the Lubrication Committee of its Division of Marketing.

"*Regular Type*—This term designates motor oil generally suitable for use in internal combustion engines under moderate operating conditions."

"*Premium Type*—This term designates motor oil having the oxidation stability and bearing corrosion-preventive properties necessary to make it generally suitable for use in internal combustion engines where operating conditions are more severe than regular duty."

"*Heavy Duty Type*—This term designates motor oil having the oxidation stability, bearing corrosion-preventive properties and detergent dispersant characteristics necessary to make it generally suitable for use in both high-speed diesel and gasoline engines under heavy-duty service conditions."

On April 29, 1952, the board of directors of the A.P.I. formally approved a new system of service classifications and designations for lubricating oils for automotive type engines which are as follows, and which supersede the previously described types:

"*Service MS*—Service typical of gasoline or other spark ignition engines operating under unfavorable or severe types of service conditions and where there are special lubrication requirements for deposit or bearing corrosion control, due to operating conditions or to fuel or to engine design characteristics.

"*Service MM*—Service typical of gasoline and other spark ignition engines operating under moderate to severe service conditions, but presenting problems of deposit or bearing corrosion control when crankcase oil temperatures are high.

"*Service ML*—Service typical of gasoline and other spark ignition engines operating under light and favorable service conditions, the engines having no special lubrication requirements and having no design characteristics sensitive to deposit formation.

"*Service DG*—Service typical of diesel engines in any operation where there are no exceptionally severe requirements for wear or deposit control due to fuel or to engine design characteristics.

"*Service DS*—Service typical of diesel engines operating under extremely severe conditions or having design characteristics or using fuel tending to produce abnormal wear or deposits."

The engine operator must rely on the reputation of his oil supplier as to the quality of motor oils supplied to meet these service classifications. When heavy-duty type oils are supplied, their quality is assured by definite engine test requirements they must meet.

Early Heavy-Duty Type Motor Oils As engine demands on the lubricating oil became more exacting the oil industry, along with some engine manufacturers, developed additive type motor oils for this more severe engine service which was termed "heavy-duty" service.

The U. S. Army's standardization program required, for simplication of the supply problem, an engine oil which would be suitable for all types of engines in all types of service. Based on the experience available on the satisfactory performance of these newly developed additive type motor oils in civilian automotive service, they issued the U. S. Army Specification 2-104B in May, 1943, for approval of motor oils for military use. This specification has been superseded by the MIL-O-2104 specification. The 2-104B specification was drawn up around a series of five laboratory engine tests which the oil industry was using to evaluate the oxidation resistance, corrosion prevention, detergency and wear resistance properties of motor oils. Subsequent experience indicated that these tests could be reduced to two which would provide the desired information. These are the CRC-L-4-949 test conducted in a six-cylinder Chevrolet engine which provides information on oxidation stability, corrosion resistance and engine cleanliness in gasoline service, and the CRC-L-1-545 test conducted in a Caterpillar single cylinder diesel engine which provides information on ring sticking, wear and accumulation of deposits in diesel service.

*Reprinted from *Lubrication* by permission of The Texas Company.

Caterpillar Superior Lubricants (Series 2) Field experience soon indicated that the early heavy-duty type oils were showing wide ranges of performance. Poorer performance was shown in engines of improved design, in equipment undergoing more severe operating conditions, and when fuel characteristics were changed to provide greater yields. In particular an increase in use of supercharging led to a deposit problem in the ring zone, and the use of higher sulphur content fuels increased deposits and wear in some engines.

This led to the development of a special supercharged single-cylinder engine test procedure using a fuel of high sulphur content (1 percent) to evaluate oils with improved properties. The test is known as the Caterpillar 1D Supercharged Engine Test. After satisfactory performance in this test an oil is subjected to a multi-cylinder supercharged diesel engine test and an extensive field test program using high sulphur fuels in both cases. Oils accepted by Caterpillar as satisfactory in all phases of testing are included in their list of "superior Lubricants (Series 2".)

The oils in this classification are recommended primarily for supercharged diesel engines using fuels with sulphur contents higher than 0.5 percent; however, these lubricants commonly called "Super Duty," "Super Lubricants," "Series 2," "Supplement 2," and "Super Detergent" oils have been used in automotive engines with remarkably excellent performance.

Supplement 1 Oils of U. S. Army Specification 2-104B The wide spread in performance quality between the old heavy-duty type motor oils and Caterpillar Superior Lubricants (Series 2) oils suggested that an intermediate performance level could be developed to provide the required improvement with more economical compounding costs. The U. S. Army Ordnance Department by means of their requirements for Supplement List 1 under the 2-104B Specification issued in May, 1949, established this performance level lubricant.

An oil to qualify must not only be satisfactory as a 2-104B lubricant, but in addition must show satisfactory performance in the CRC L-1 Caterpillar single-cylinder diesel engine test when using 1 percent sulphur content fuels.

The U. S. Army does not use the Supplement 1 specification for procurement, but some purchasers still retain the specification.

Current Heavy-Duty Oils Since the performance of the old heavy-duty type motor oils varied widely, it appeared reasonable that a higher performance level should be established for these lubricants. In this way they could be used in newly designed equipment without resorting to the Supplement 1 or Series 2 oils requiring costly additive materials which might be limited in supply in case of an increasing demand for these oils. The requirements of the L-1 engine test were made more severe in order to qualify motor oils at a higher performance level. The specification of the diesel fuel to be used in conducting the L-1 test was changed so as to have a minimum sulphur content of 0.35 percent instead of the old 0.4 percent maximum sulphur content. This imposed a more severe operating condition for the lubricating oil to combat.

This version of the L-1 test was included in the MIL-O-2104 specification issued in August, 1950, to supersede the U. S. Army Specification 2-104B. Currently motor oils meeting this higher performance level are generally available, and reliable marketers now generally classify their motor oils as heavy-duty oils only when they qualify at this performance level.

Army policy at present is to list only qualified MIL-O-2104 oils without differentiation. Those having a legitimate need for this list will be supplied with it, but it may not be published as an Ordnance list or with qualification numbers shown.

TABLE IV
Old Crankcase Oil Classification
(Dropped April 3, 1952)
SAE Recommended Practice

SAE Viscosity Number	Viscosity Range, Saybolt Univ., Sec.			
	at 130° F.		at 210° F.	
	Min.	Max.	Min.	Max.
10	90	less than 120	—	—
20	120	less than 185	—	—
30	185	less than 255	—	—
40	255	—	—	less than 80
50	—	—	80	less than 105
60	—	—	105	less than 125
70	—	—	125	less than 150

SAE Viscocity Classification Although various types of motor oils are available to meet minimum performance levels, they must also be classified according to viscosity grades since oil viscosity is still a very important factor in lubrication.

The SAE has set up new viscosity classifications for motor oils. These limits were put into effect October 3, 1950, and the old classifications became void on April 3, 1952. A comparison of the old and new classifications is shown as Tables IV and V. The period overlapped by the two classifications was to provide sufficient time for the supplier to change manufacturing limits.

Fig. 9A—Material centrifuged from Oil No. 1.

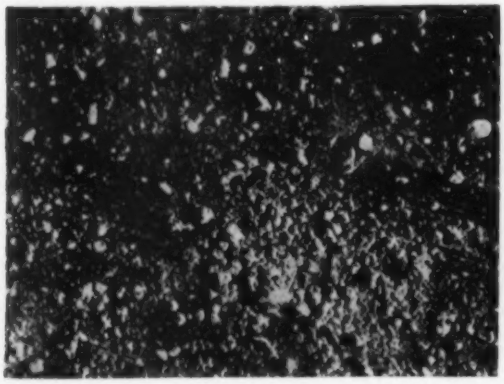

Fig. 9B—Material centrifuged from Oil No. 2.

TABLE V
New Crankcase Oil Classification
(Effective Oct. 3, 1950)
SAE Recommended Practice

The SAE Viscosity Numbers constitute a classification for crankcase lubricating oils in terms of viscosity only. Other factors of oil character or quality are not considered.

Viscosity numbers without an additional symbol are based on the viscosity at 210° F.

Viscosity numbers with the additional symbol "W" are based on the viscosity of 0° F.

The viscosity of oils included in this classification for use in crankcases shall be not less than 39 seconds at 210° F. Saybolt Universal.

SAE Viscosity Number	Viscosity Range, Saybolt Univ., Sec.			
	at 0° F.		at 210° F.	
	Min.	Max.	Min.	Max.
5W	—	4,000	—	—
10W	6,000 (Note A)	less than 12,000	—	—
20W	12,000 (Note B)	48,000	—	—
20	—	—	45	less than 58
30	—	—	58	less than 70
40	—	—	70	less than 85
50	—	—	85	less than 110

Note A: Minimum viscosity at 0° F. can be waived provided viscosity at 210° F. is not below 40 Saybolt Seconds Universal.

Note B: Minimum viscosity at 0° F. can be waived provided viscosity at 210° F. is not below 45 Saybolt Seconds Universal.

In case of prediluted oils, SAE Viscosity Numbers by which the oils are classified shall be determined by the viscosity of the undiluted oils.

Wherever the SAE Viscosity Numbers are used on prediluted oils, the container labels should show in some suitable manner that the SAE number applies to the undiluted oil.

SELECTION OF A MOTOR OIL

It is hoped that the preceding discussion has clarified the motor oil classification as to the reasons for having a large number of different types and why each type has a definite minimum performance level. The primary improvement in heavy-duty oils has been an increase in detergency level. In many cases the additives used to improve the detergency level also impart some inherent oxidation stability and corrosion-preventive properties. The question naturally arises as to which oil to use in a truck or bus engine.

In selecting gasoline as discussed in the previous issue of *Lubrication* it was mentioned that the octane of gasoline need not exceed appreciably the octane requirement of the engine. The same principle is generally true in the selection of a motor oil; its performance level need not exceed the engine requirement. Based on the A.P.I. designations a selection may be made as follows:

"DS" —Usually above the current heavy-duty performance level oil, — such as Supplement 1 oils.

"DG" } —Current heavy-duty per-
"MS" } formance level oils.

"MM"—Quality straight mineral oils containing oxidation stabilizers.

"ML"—Quality straight mineral oils.

Then if it is found basis experience that the particular service requires a higher performance level, select an oil that is one level higher. It is not possible to be more specific than this for the the following reasons:

1. All engines are not equally sensitive to the effects of fuel composition on wear and deposits, and the lubricating oil is expected to overcome both these evils regardless of sensitivity.

2. The range of sensitivity within one engine may vary according to operating conditions.

3. Operations with the same type of equipment vary among the different fleets.

Since MIL-O-2104 level oils are generally recommended for truck and bus engines, some oil suppliers market through their service stations an oil of this performance level as a premium grade oil, so that the small fleet operator may have this type of product generally available.

Oil Drain Periods An explanation of oil type classification is usually followed by questions regarding oil drain periods. Many feel that oil drain periods should be materially extended by going to higher performance level oils. This may not always be possibe. The oxidation stability at the MIL-O-2104 level appears to be sufficient for automotive engine service. The improved heavy-duty oils are required to provide better engine cleanliness and less extensive wear; however, their improvement in oxidation stability (inherent in some of the additive materials used) is not always required.

Heavy-duty oils must be drained not because of oxidation but because of contamination. Heavy-duty oils do not wear out, but engines service imparts certain characteristics to the oil which with continued use may lead to excessive wear and reduced engine efficiency, with a resultant increase in fuel and repair costs. With use, oils are contaminated with carbon, metal particles, water, unburned fuel, dirt, dust, etc. Although oil filters partially remove some of these contaminations, those that remain in the oil change its characteristics and impair its lubricating properties. The film of oil which originally was thick enough to provide proper lubrication and piston seal is thinned by the presence of water and fuel dilution. Compression losses are increased and blow-by and wear are accelerated.

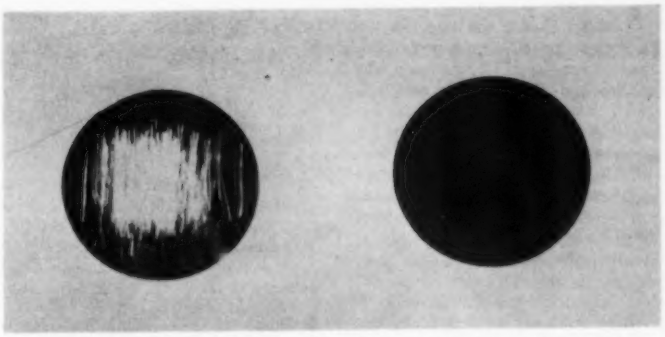

Fig. 10—Left: Oil No. 1. Right: Oil No. 2. Abrasiveness of material centrifuged from used oil polished steel specimens 670 Brinnel.

A contaminated oil cannot perform its function of lubrication as abrasive materials are carried by the oil film between moving metal surfaces to become a cause of wear. A dirty oil will not cool as efficiently as a clean oil since dirt acts as an insulator. If the contamination rate exceeds the filtering or removal rate, such as occurs in light delivery service, the oil will soon drop out these materials and they will form engine deposits.

The drain period depends on many factors such as type of service, conditions of operation, design of the engine, maintenance, and the fuel and oil in use. The period is best determined by studying the operation and the analysis of sufficient used oil samples at various mileages to obtain a representative condition of the oil. The longest drain periods are obtained when using the proper fuel and motor oil, with good maintenance and proper engine operation. Always drain crankcases, differentials, and transmissions with the lubricant hot for best removal of contaminants.

Caution must be exercised in commenting on used oil analyses. For example, note the two analyses shown as Table VI. These samples can be considered as having been subjected to the same sort of service with respect to type of engine, miles of operation, and type of operation. Basis

the analyses shown the two oils do not appear to be significantly different in condition. By carrying the analyses one step further and obtaining a spectrographic analysis on the ash-forming material it may be noted, as shown in Table VI-A, that both oils contained lead which originated from leaded fuel combustion, and in addition Oil No. 2 contained silicon. The presence of silicon usually indicates that dirt or dust has entered the crankcase of the engine. The most usual source of entry is through air leaks or improper maintenance of carburetor and breather air cleaners.

To many this may appear to be a minor point; therefore the used oils were centrifuged and the contaminating material was removed. Photomicrographs, at 25 magnifications of these materials are shown as Figures 9A and 9B. Note the soft sludgy appearance of the leaded fuel combustion products which were predominant in Oil No. 1 (Fig. 9A) and compare them with the hard coarse granular material removed from Oil No. 2 (Fig. 9B).

TABLE VI—Used Oil Analyses MIL-0-2104 Oil From Automotive Gasoline Engines

Oil No.	1	2
Appearance	Very dark gray-green liquid	Very Dark gray-green liquid
Odor	Normal Used	Normal Used
Water, %	Trace	Trace
Viscosity, SUS @ 100° F.	450	448
Free Carbon, %	0.07	0.03
Neutralization Number	0.45	0.36
Ash, %	0.75	0.90

TABLE VI-A—Spectographic Analysis

Oil No.	1	2
Major Foreign Components	Lead	Lead, Silicon

These materials were placed on polished steel specimens of 670 Brinnel hardness. A drop of unused oil was added, and the mass was rubbed across the steel surface by means of a wax stick (light pressure). The effect on the steel surfaces may be noted in Fig. 10. Would you continue to use Oil No. 2 in your engine?

The reputable oil marketer, when he insists on oil drains, is not trying to increase oil sales. He knows that a few extra oil changes which are relatively economical result in a saving in costly repairs. He is helping increase the life of your engine.

ENGINE BEARINGS

Diagnosis of bearing failures must be approached with full knowledge of all possible causes. Cases of engine bearing failures have been noted which although they appear to have been caused by faulty lubrication, were definitely due to improper servicing and maintenance. Some of these failures seem to be premature fatigue failures, while others seemed to indicate corrosion. Improper servicing in many cases is not due to negligence but rather to lack of knowledge as to how bearings and shafts function with respect to each other.

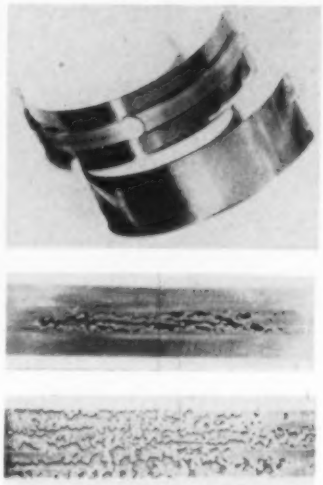

Fig. 11—Typical bearing fatigue failures. Top, new main bearings; upper, left; lower, right. Center, early failure pattern. Bottom, complete failure pattern.

The majority of the failures occur in conjunction with replacement inserts installed at the time of engine overhaul. Engine owners and operators tend to blame the lubricant for their difficulty, although it has been conclusively shown that the majority of bearing failures generally are mechanical and associated with bearing design *i.e.* an unloaded upper half of a main bearing with its full oil groove operating with an ungrooved matching lower half as shown in the top picture of Fig. 11.

A typical early failure presented in the center view shows a broken region and many hairline cracks on the mating half. Further service leads to the condition shown in the bottom picture. This last condition is that which leads to the accusation of the lubricant "corroding" the bearing: unfortunately, visual diagnosis cannot verify or deny this allegation. Microscopic examination, however, definitely shows these failures to be the result of metal fatigue.

An explanation advanced for the failure of an initial set of bearing inserts of this type is a hydraulic phenomenon that may cause a "waterhammer" at certain engine speed and loads which tends to produce high unit loads sufficient to fatigue the bearing alloy.

Another reason for such failures is that the lubricant will generally attempt to cut its own groove. Unfortunately, when this occurs, the undisturbed bearing surface is so drastically overloaded that it quickly pounds out.

A third explanation is that localized fatigue predicates a build-up of dirt or other abrasive material at the parting face of the assembled bearing. This dirt is carried into the solid insert and there disrupts oil films, displaces bearing metal, raises temperatures, and fatigues bearings.

The preponderance of bearing failures have involved replacement inserts. The failure pattern shown in Fig. 11 is believed to be caused by crankcase journal "camming" or ridging. The ridge gradually forms on the shaft because of uneven wear rates between the part of the journal in contact with the partial oil groove and the rest of the journal which runs against the solid bearing. The original bearings will usually conform to the change in journal contour but new bearing shells installed on a shaft will quickly fail in the center zone from overload fatigue. Such a ridge can be extremely slight and it is possible that on a highly polished shaft, it might be almost imperceptible to the eye and may not be measurable with ordinary mechanics' tools (0.00075 inches or less). This ridge formation should be removed before installing replacement inserts. In the known absence of a journal ridge, the failure of replacement bearings would be attributable to causes similar to those destroying original bearings. The use of various bearing metal combinations have helped reduce this problem.

This experience has made it obvious that a perfunctory glance at failed engine bearings may lead to erroneous conclusions regarding the cause of failure. Therefore, unless other engine conditions definitely establish the cause of failure, the failed bearings should be examined microscopically by a qualified observer. To derive the most meaning from microscopic observation, some sound bearing metal should still be present on the steel back.

CONVENTIONAL TRANSMISSIONS

Straight mechanical or conventional transmissions are used in most truck service and inter-city bus service where sustained high-speed operation prevails. The trend in lubrication of these units is increasing toward the use of SAE 50 engine oils in the high-quality, heavy-duty classification. The good oxidation resistance, EP properties and anti-corrosive and anti-rust properties of these oils make them ideally suited for this service. However, in transmissions, particularly auxiliary units wherein high EP properties are required, gear lubricants having these properties should be used. These lubricants are discussed more fully under "rear axles".

Transmissions must be drained at regular intervals. This fact is not usually appreciated. The reasons for draining are primarily the same as those of engine oils. In addition, however, when straight mineral oils are used in these units, the prevailing high temperatures may cause oxidation to occur. Where lubricants have been used to the point where oxidation and contamination may have become excessive, it is good policy to flush the gear case before adding a fresh lubricant charge. Oxidation materials from the previous charge and metal particles (particularly those containing copper) when introduced to the fresh lubricant, will act as oxidation promoters reducing the possible service life of the new charge of lubricant. When lubricants are used close to their maximum service life, drain periods should be reduced if the severity of operating conditions warrants; otherwise "coking" difficulties may be experienced. If power takeoffs are added to a transmission, a greater volume of lubricant will be required. *Don't operate with the lubricant level too low.*

REAR AXLES— GEAR LUBRICANTS

The knowledge of gear lubrication has increased tremendously in the last half century. In the years following early developments of the automotive industry, rear axle lubrication received little attention. Gears were plain and simple, and any heavy oil stock was considered to be satisfactory. Oil changes were no problem; leakage was sufficient to take care of a lubricant change. With such gears rather wide adjustments were permissible without failure although the noise level at times became annoying. All sorts of "fillers" were added to the lubricant to cushion shock loads and reduce noise. As the truck and bus industry developed, it became necessary to widen the range of speed reduction (torque multiplication) to reduce the size of the unit and to lower drive shafts to make a better designed vehicle with greater stability and utility. Many of these changes led to increased gear tooth loads and introduced sliding action along with pressure. Today rear axles contain most of the common types of gears singly or in combination, depending on the service requirement. In all rear axles one stage requires transmission of power through perpendicular shafts (or askew, angle-drive) using either straight bevel, spiral bevel, hypoid, or worm-and-wheel gear combinations and some form of differential action. To gain greater speed reduction or torque multiplication some of these combinations may be combined with spur, helical, and herringbone parallel shaft reductions. To further complicate the mechanism but to obtain a wider range of service, levers and appropriate gear sets may be included to provide more than one speed reduction. It is obvious that these complex units impose definite requirements on the lubricant. Also if lubricant characteristics are impaired through use, the lubricant must be changed promptly to avoid costly repairs or low service life.

To take care of this multiplicity of possible combinations of gears the Lubricants Committee of the Division of Marketing of the A.P.I. have set up gear lubricant classifications which are used by the SAE. These are as follows:

"Regular Type Gear Lubricant—This term designates gear lubricants generally suitable for use in automotive transmissions and in most spiral-bevel and worm-gear differentials."

"Worm Type Gear Lubricant—This term designates gear lubricants generally suitable for use in truck-type worm-gear rear axles under very severe conditions of service."

"Mild Type EP Gear Lubricant—This term designates gear lubricants having load-carrying properties suitable for many automotive transmissions and spiral-bevel differentials under severe conditions of speed and load."

"Multipurpose Type Gear Lubricant—This term designates gear lubricants having load-carrying properties suitable for hypoid gear and other types of differentials and transmissions."

These definitions are somewhat broad and include all of the gear lubricants that are generally suitable for the various services normally encountered. There are no definite restrictive limits for these lubricants except in the Multipurpose classification. Here the Military MIL-L-2105 Specification "Lubricant Gear, Universal", sets up definite requirements for qualification. The lubricants so qualified must not only comply with definite viscosity, as well as corrosion and rust protection requirements in the SAE 75, 80, and 90 grades, but must also pass definite storage stability, foaming, and axle tests in the SAE 90 grade. Present requirements do not include the SAE 140 grades in this specification. Some suppliers, in addition to qualifying their products, evaluate these lubricants by extensive special road and field tests to assure proper product quality before marketing. The SAE viscosity classifications of gear lubricants revised by the Fuels and Lubricants Technical Committee January, 1952, are shown as Table VIII.

The same reasons as noted under motor oils and transmissions apply to rear axle lubricant changes. Although in most cases rear axle life appears to be equal to vehicle life, improper service, maintenance, and lubrication have led to premature failures.

TABLE VIII
SAE Viscosity Classifications for Transmission and Axle Lubricants—Saybolt Universal Seconds

SAE Viscosity Number	0° F.		210° F.		Consistency Must Not Channel in Service at °F.
	Min.	Max.	Min.	Max.	
75	—	15,000	—	—	—40
80	15,000[a]	100,000	—	—	—20
90	—	—	75	120[b]	—10
140	—	—	120	200	+20
250	—	—	200	—	—

[a] The minimum viscosity at 0° F. may be waived if the viscosity is not less than 48 SUS@210° F.
[b] The maximum viscosity at 210° F. may be waived if the viscosity is not greater than 750,000 SUS at 0° F. (extrapolated).

CHASSIS

All of the chassis bearing points require periodic renewal of the lubricant to minimize wear, reduce friction, and eliminate noises. The lubricant used should be readily pumpable since the lubrication points are equipped with grease fittings. It should form a tough, durable long lasting film on the bearing parts. It should be adhesive and cohesive so that it will not readily "run out" of bearings. It should withstand heavy hammering blows and loads without jolting or squeezing out of bearings. It should

resist water washing and seal against entry of dirt, water, and other contaminants and should not permanently change materially in texture and consistency under these severe conditions. It is obvious that a lubricant developed specifically for this purpose is required. Such products are generally available.

The usually accepted renewal period is at 1000-mile intervals; however, under unusually severe or mild conditions it may be necessary or possible to vary from the general recommendation. Cleanliness and application without severe pressure at points involving seals are the only precautions necessary in chassis lubrication. In other words, clean all fittings before applying grease; don't over lubricate and clean off excess grease.

Normally oil can points should be lubricated at the same time as the grease points. An SAE 20 grade motor oil is usually recommended for this application and in most cases the type used for engine lubrication is suitable.

Some fans, distributors, and generator and starter bearings require grease lubrication. Good quality ball bearing greases or multi-purpose type greases are usually best suited for these applications although cup greases and petroleum jellies are often used. The main caution is again cleanliness; and don't overlubricate in quantity but lubricate at regular intervals.

Water pumps that require renewal of lubricant are best lubricated with special water-resistant greases developed for this application.

Some controversy appears to exist with respect to spring lubrication; however, if the manufacturer's recommendations are followed no particular difficulties should be experienced. The friction between the spring leaves control the action and thereby the ride. Spring leaves which are laminated with special materials to regulate the interleaf friction usually do not require inner lubrication. All that is necessary is an outside spray as a protection against rust. Other types, usually all metal covered types, require a graphited products. The lubricant serves as an anti-rust agent, seals against entrance of dirt and other contaminants, and is intended to regulate the interleaf friction. These graphite greases should be insoluble in water and water-resistant. The general precaution is cleanliness; lubricate at chassis interval and don't over lubricate.

Hydrovacs that require lubrication are normally lubricated with a vacuum cylinder oil. Specific amounts are usually specified by the manufacturer, and lubrication periods are usually 10,000 miles for 9½-in. single piston units and 20,000 miles for other units. Lubricate only with engine shut off and brakes released, being particularly careful of cleanliness and amount of oil supplied.

When self lubricated compressors are used, check oil level at the same time as the engine crankcase. Oil drains usually may be made at the same interval as the engine crankcase. The same oil used for the engine may be used for these units unless the manufacturer specifically recommends otherwise. Air chambers on brakes are generally of the diaphragm type and require no lubrication.

Anchor pins of certain types of brakes are provided with tapped holes for lubrication fittings and are usually lubricated with the chassis lubricant to prevent binding action. Other types require lubrication only at the time of brake inspection or relining when the pins should be cleaned and lubricated according to manufacturer's recommendations.

Slack adjusters are of two types and serve as a brake lever and act as a simple brake adjustment. The open screw-type adjuster requires no lubrication while the enclosed worm-and-gear type is equipped with a plug fitting for applying chassis lubricant at approximately 25,000-mile intervals.

FIFTH WHEEL

The truck tractor carries the front end of a tractor by means of a turntable or fifth wheel. This mechanism mounted on the rear of the tractor chassis consists essentially of a table with pedestal bearings which allow it to move freely on its axis. The tractor moves freely on the turntable pivot, so that it may follow the tractor in any direction. Fittings are provided for the bearings at both ends of each shaft and for the table. The bearings are lubricated at the same frequency and with the same product as the chassis. Although a good chassis lubricant may be used for the turntable, a graphite grease like that used for spring lubrication is more suitable in view of its greater water resistance, water insolubility, and the action of the graphite filler.

STEERING GEAR

Power steering was supplied as original equipment for cars for the first time in 1951 on one make of car. The idea of power steering dates back over 75 years and has been previously applied to rugged off-the-highway trucks and military vehicles. At this writing the truck industry has not announced power steering as original equipment for on-the-highway vehicles but an announcement of this type should be expected in the very near future.

Last year a bus was announced which is equipped, with intensive hydraulic controls and includes power steering. This power steering unit is now also being supplied on another make bus. In these units the fluid not only acts as the actuating medium but must also lubricate the moving parts. The Automatic Transmission Fluid Type "A" products now generally available appear to be very suitable fluids for these units because of their characteristics as noted previously in discussing automatic transmissions.

The conventional steering gear boxes require various lubricants depending on the design of the unit. However, most of the units are suitably lubricated with chassis lubricants or gear oils. The frequency of lubrication is usually at the time of chassis lubrication. The important precaution is again cleanliness. Don't overlubricate and don't use excessive pressure that will damage seals.

UNIVERSAL JOINTS—SPLINE SHAFTS

The universal joint comprises two yokes at right angles to each other and an intermediate member which may be either a cross, a block, or a ring. Since in most applications the distance between points connected by shafts with universal joints will vary, splined-shaft mountings are used to permit sliding motion. Some of the constant-velocity type joints allow for the sliding in the joint, and splined mountings are not necessary.

Universal joints that are enclosed and mounted in back of the transmission gear box are usually lubricated by the gear box lubricant. Other universal joints may have an oil reservoir in the cross or trunnions. Some universal joints have sufficient lubricant capacity so that the original supply is good for the life of the vehicle or replenished after long periods of service such as 20,000-30,000 miles. A lubrication fitting is usually provided for this purpose. However, some types require disassembly for lubrication. A relief valve or hole is usually provided to prevent overlubrication and/or damage to seals. The slip joints (spline shafts) are always closed at one end by a disc or cap fitted to the yoke of the universal and at the other end by a packed

More Information, Please

CHECK AND MAIL THE CARD BELOW FOR ADDITIONAL INFORMATION ON NEW MACHINERY AND SUPPLIES

1. Torcon Heavy-Duty Torque Converter. Bulletin TC-640. The six pages of this folder illustrate the general appearance of the torque converter, show the machines using them, and picture the internal structure. The text lists the advantages and explains the operation of the converters. A chart provides for the preliminary size selection of the converter. A partial list of prominent machinery manufacturers using the converters on their products is given. Torcon Corporation.

2. Sheppard Diesel Industrial Tractors. Bulletin No. A5201-1. This four-page folder illustrates a diesel tractor in several applications. Front end buckets, forks and blades are shown as well as a rear end digger, and a haulage unit. Specifications of four sizes of tractors are given. Sheppard Diesels.

3. Flexible's Line of Tubing. Catalog C2-3. This folder describes a line of flexible tubing in sizes from less than 1 in. to 30 in. The line consists of tubing and ducting that is used for dust and fume removal, materials handling, ventilation and similar uses. The characteristics of the various kinds are given and the availability of specialized literature on each type is listed. Illustrations show typical applications. Flexible Tubing Corporation.

4. Farrell-Cheek Alloy Cast Steel Sheaves. Form 40-GR-652. The six pages of this folder present the facts about sheaves in a complete manner. Grooves, alloy, treating and machining are covered. Sheave and rope size recommendations, sizes of sheaves, rim styles and accessories are covered. Farrell-Cheek Steel Co.

5. Electric Power Distribution and Protection for Open-Pit Mines and Quarries. Booklet B-5447. The 39 pages of this comprehensive booklet emphasize that properly engineered installations minimize hazards. Ratings of transformers, shovel performance, power factor correction, and distribution system layouts for different types of mines are covered. Included is a discussion of systems used for ground protection and a description of the problem of grounding with an illustration showing the equipment needed and its location. Recommendations for substation protective apparatus are given and the line of equipment made by the company is described and illustrated. Westinghouse Electric Corporation.

6. Schramm Golden Anniversary Construction Tools. This small size folder uses color to present the line of tools made by the company. Air compressors, wagon drills, rock drills, breakers, drivers, diggers, tampers, and accessories are shown and briefly described. This folder serves to acquaint the reader with the many items in the line. Schramm.

7. Here's What Trabon Centralized Lubrication System Can Do for You. Bulletin 529. This four-page folder illustrates and presents information about automatic lubrication systems. Engineering description of methods of operation of both a reversible and a manifold type of lubricating system are covered. Various types of pumping units are included in the illustrations. Trabon Engineering Corporation.

8. Everything for Safety. Catalog 100. This 144-page catalog describes face shields, welding helmets, skin protective coatings, safety clothing, machine guards, first aid supplies, and just about everything likely to be needed in a plant for safety. The Boyer-Campbell Company.

9. World's Most Advanced Line of Excavating and Materials Handling Machines. An ad reprint with a cog-wheel design attached that presents several applications of crawler and truck mounted cranes, shovels, backhoes, draglines, and clamshells. The brief text highlights the major points of the machines. Osgood-General.

10. Protective Coatings—Their Applications and Methods of Use. This catalog presents facts about protective coatings and their industrial applications. The use of the materials to repair conveyor belts and to protect equipment from abrasion and corrosion is described. The line of coatings is listed and applications suggested. Instructions for using the several kinds of coatings are given. Magic Chemical Company.

11. Bailey Instrument and Controls for Process Industries. Bulletin 17-D. The eight pages of this bulletin cover the instruments and controls in six groups: process controllers, electronic and mechanical; control components, relays, valves and drives; control systems, one- two- and three-element type; measuring components, temperature, pressure, flow, level, smoke density, gas analyzers, etc.; and instrument combinations, for indicating, recording and integrating. Bailey Meter Company.

12. How to Solve Process Dust Problems. Bulletin B-101. This is a six-page folder that uses diagrams, photos, charts, and graphs to bring out the features of a multiple miniature cyclone type of dust collector. Many different installations are diagrammed and a partial list of prominent users is given. Some typical plant installations are shown and described. Dustex Corp.

13. The Lubrication of Fafnir Ball Bearings. Form 426. The basic reasons for lubricating ball bearings are presented in this eight-page bulletin. Choice of oil or grease is covered and recommendations for the use of each is covered. Drawings of bearing and housing designs show the method of lubricating and the text points out the preferred applications and the features. The Fafnir Bearing Company.

14. Multiwall Paper Bags by Bagpak. Brochure No. B52. This sixteen-page booklet deals with the five basic types of multiwall bags. Each type is illustrated with construction features being shown. The text covers filling methods, closure, and plies used in fabrication.

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Paper, printing and bundling of bags is covered briefly and methods of closure and packaging machines are shown. Photos show the use of multiwall bags and some of the facilities of the company for manufacturing the materials used in bag making. Bagpak Division, International Paper Company.

15. **Galion Allsteel Hydraulic Hoist Data Sheet.** This sheet is one of a series of bulletins that describe the complete line of hydraulic truck body hoists. Each bulletin contains full specifications for one individual hoist. Among the information listed is: type, weight, stroke, cylinder diameter, mounting height, dump angle, and piston rod diameter. The bulletin is illustrated with close-up hoist pictures and applications photos. A cutaway view shows the hydraulic pump construction. The Galion Allsteel Body Company.

16. **Marco Standard Tubular Frame Conveyors. Bulletin SF-1.** A tubular frame conveyor is the subject of this eight-page bulletin. The center spread of the booklet illustrates the component parts of the conveyor with close-ups showing some of the construction details. Typical installations are illustrated and two pages are used for a table and diagram giving sizes and dimensions. Accessories for special applications are shown. The use of pre-engineered assemblies is explained and the advantages cited. The text brings out the points not covered by pictorial material. E. F. Marsh Engineering Co.

17. **Kennedy Pneumatic Transport Systems. Bulletin No. 52-F.** A dual purpose is accomplished by the twenty pages of this booklet. First, the reader is introduced to the company and its facilities, and second, to the several types of pneumatic transport systems that are being made by the firm. Covered are an automatic transport pump, manual pneumatic transport pump, air activated shipping containers and air conveyors. Several installations of note are shown. A complete list of equipment manufactured by the company is given. Kennedy Van Saun Manufacturing and Engineering Corp.

18. **Big Producer the "Cat" DW21. Form 117, 30565.** Moving big loads, over long hauls and at high speeds is told by means of action pictures in this eight-page bulletin. The tractor teamed with a scraper is shown loading, hauling, and dumping. Operating and mechanical features of the machine are explained. Caterpillar Tractor Company.

19. **Eagle Double-Roll Shale Crushers. Bulletin 962.** This bulletin covers a double roll crusher that is designed to reduce clay and shale. Typical installations in lightweight aggregate plants are shown. The action of the double rolls in feeding and breaking up chunks is explained. Eagle Iron Works.

20. **The Goodyear Story.** The twenty-four pages of this booklet present a condensed history of the company. The growth of the company from its inception to the present is covered. Photos show the original plant and the more than 43 plants all over the world of the present. Research, and product development are covered and the principles of the company are explained. This is an interesting story of the growth of a major company and of its spread to all parts of the world in search of materials and markets. The Goodyear Tire and Rubber Company.

21. **Rainbow Rock Provides the Key to Economical Modern Building.** This single sheet shows a home constructed of the material and explains the points of advantage. The machine for making the concrete rock is shown and described, and some of the markets are pointed out. Specifications and production figures are given. General Engines Company.

22. **Phil-O-Seal. Colorless, Penetrating Water Repellant for all Masonry Surfaces.** This folder describes a material for use on masonry surfaces to give water repellency without coloring or coating the surface. The material is described as to its penetrating action. Allied products for other surfaces are listed and directions for application are given. Phil-O-Seal Inc.

23. **Now! For the First Time. A truly Portable Batching Plant.** This four page folder illustrates a method for operating a batching plant by use of three portable components—a self-loading weigh batcher on wheels, a portable conveyor, and a transit truck mixer. Typical applications are shown and the mobility of the method is described. This is general introduction to the features of this method of concrete batching. Willard Concrete Machinery Sales Co.

24. **Stroh Process Steel Products Used in the Cement Industry.** This is a ten-page looseleaf catalog. It describes and illustrates replacement parts for rotary kilns, coolers, driers, ball mills, tube mills, rod mills and similar equipment. The parts covered include gears and pinions, tires, trunnion rollers, wheels, sprockets, and sheaves. The process of making the steel and the parts from it are covered. Stroh Process Steel Company.

25. **Cut Bag Packing Costs.** A bag packer for powdered, granular, pellet and fibrous material is the subject of this four-page folder. The machine is shown in application and cutaway views. Features are explained and the advantages of using valve bags are given. The automatic weighing feature is covered. E. D. Coddington Manufacturing Company.

26. **Imperial Hydrocreter . . . An Entirely New Kind of Transit Mixer.** Specifications, illustrations and text bring out the characteristics of this hydraulically powered transit mixer. Details of the hydraulic drive, the features of the drum and the blades are explained. Other features of the machine are discussed. Imperial Construction Equipment Company.

27. **Baker Industrial Trucks. Catalog 54.** This eight-page booklet describes and illustrates a line of industrial trucks and cranes. A section of the booklet tells how to select the right size truck for the job conditions, while other sections show the specifications of fork and ram trucks, platform trucks, and crane trucks as well as the general line of industrial models. Construction features and a line of special attachments are covered. The Baker-Raulang Company.

28. **Two-Headed Sewing Pedestal. Bulletin No. 5201.** This data sheet illustrates a sewing machine for closing paper, cloth, or burlap bags. Photographs and text illustrate and describe how one sewing head is reloaded while the other is sewing so that the sewing operation is uninterrupted. Richardson Scale Company.

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"But . . ."

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We welcome the challenge of the toughest three-letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

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*August, 1951 research study.

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seal, and are usually equipped with independent lubrication fittings.

Universal joints are mainly lubricated with an SAE 140 grade oil but some require a grease. Slip joints are usually grease lubricated although some require an SAE 140 grade oil. Lubrication periods if not of the long period type should be at the time of chassis lubrication.

The main reason for relubrication of these automotive vehicle components is loss of lubricant and contamination. A few simple precautions in servicing these units will assure trouble-free long service life. These are: lubricate at manufacturer-specified periods, clean dirt from fittings before lubrication, and do not overlubricate. In lubricating universal joints that require disassembly remove all used lubricant, wash parts, dry, and relubricate immediately when dry.

WHEEL BEARINGS

The most difficult lubrication point on a vehicle is the wheel bearing since it not only involves the proper application of a suitable lubricant but also requires the mechanical know-how of handling and adjusting a precision mechanism. Each phase of the process is equally important to attain maximum bearing life. An anti-friction bearing will not wear out if it is properly adjusted and kept free of abrasive materials and other contaminants that interfere with the rolling action. Normal termination of bearing life is by failure of the contacting surfaces.

The bearing manufacturers have load and speed rating maximums for each specific type and size of bearing which, if not exceeded, result in a definite expected bearing life.

It is the responsibility of the vehicle designer to consider these maximum load and speed ratings and applying the proper safety factors to assure long life. The greater the margin of safety applied the longer the expected life will be. The operator's considerations for maximum wheel bearing life are equipment loading, type of operation, and service and maintenance.

WHEEL BEARING LUBRICATION

The main purposes of a fluid lubricant for wheel bearings are to prevent rust and to facilitate as easy rolling as possible. Therefore all that is necessary is a thin film of oil which should be free from contamination that may cause wear, should have high resistance to oxidation, gumming and deterioration, and should not corrode any of the parts. Since the function of an antifriction bearing is to reduce friction, the viscosity of the lubricant should be as low as possible to minimize fluid friction. Normally as speed is increased, the viscosity of the oil should be decreased, of course within limits, let us say for example 80 to 100 seconds Saybolt Universal at the operating temperature. With roller bearings when end thrust develops to a large extent or where pressures may be high, an increase in viscosity appears to be desirable.

One manufacturer has recognized that oils are very desirable wheel bearing lubricants and markets conversion kits for use on both live and dead axles. Service experience reported on these units is very favorable. However, extreme care must be exercised in installing and maintaining the oil seals since leakage difficulties would be more serious than if grease were in use.

GREASE LUBRICATION

A suitable wheel bearing grease must provide lubrication without affecting the low frictional characteristics of the bearing; as it functions as a seal to prevent the entry of foreign matter it must not tend to leak out of the bearing. A suitable grease for this application must resist separation and it should be free from acid-forming tendencies, and fillers or materials which might give rise to oxidation, corrosive reaction or decomposition. It should not be too fibrous or stringy; otherwise starting and running friction may be affected. The texture also can affect the retention on the cage and rollers. High stability, rather high melting point, and no hardening, caking, or excessive softening over a wide temperature range are other desirable characteristics. Wheel bearings operate mainly below 150°F. However, mechanical conditions can quickly arise that will raise temperatures above 250°F.

Greases are divided into different classes according to their base and soap type, the most common are calcium, sodium, mixed base, lithium, aluminum, potassium and lead soap types. Calcium-sodium (mixed-base), sodium soap, and lithium soap greases are most widely used for wheel bearing application. Calcium soap greases of the normal type channel readily and should not be used above 150°F. maximum since above this temperature water used in their manufacture is driven off, ultimately causing grease breakdown. Hence they are not suitable wheel bearing greases. Sodium soap greases do not break down at the higher temperatures. However, they will usually be fibrous in nature unless special processes are used in manufacture that minimize this fibrousness, to make them suitable for heavy-duty usage. Lithium soap greases usually have very high melting points and are very resistant to water washing. This type is coming to be referred to as a so-called multipurpose grease. Mixed bases of calcium and sodium produce products with good resistance to leakage, low starting torque in cold weather, good high temperature stability and shear stability.

Considerable time, money, and effort has been and is being spent on developing specialized greases and numerous tests are available in the laboratory that measure the various properties of low temperature torque, oxidation resistance, breakdown resistance, stability, water resistance and leakage.

In reviewing the vehicle manufacturer's recommendations for wheel bearing repack periods it may be noted that wide differences in mileages exist. To some this may be an indication that the lubrication of wheel bearings is a controversial subject. Actually this is a poor argument since these mileages are usually based on experience and are made to coincide with known servicing mileages. The type of lubricant recommended and the definiteness of this recommendation also influence the repack recommendation. Many manufacturers also are very conservative and reduce their recommendation to cover some of the more severe service conditions and the inferior quality of lubricants some operators are prone to use.

The practical repack period is at the time of brake shoe relining. If other conditions arise that require wheel pulling and the possibility of dirt, water or other contaminant entry exists, it is wise to clean and repack the bearings even though the lubricant appears to be in good condition. It is recognized that many operators do not attain this practical repack period. The reasons are usually severe overloading in service which may or may not be coupled with features of improper packing, improper bearing adjustment, overpacking, use of wrong lubricant, severe road conditions, excessive water washing, improper application of the lubricant, and poor seals or seal maintenance.

Much has been written about the method of cleaning, inspecting, and repacking wheel bearings which need not be repeated. However, even the most experienced at times get lax and forget the cautions neces-

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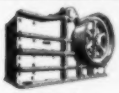
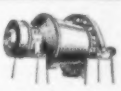


Jaw Crushers

Gyratory Crushers



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sary to accomplish a satisfactory wheel bearing lubrication job. Things that adversely affect wheel bearing lubrication and performance are shown as Table IX.

The chief controversy in wheel bearing lubrication is: how much grease should be put in the wheel hub? Some grease is required to prevent rusting. The spindle should also be very lightly smeared with the grease for the same reason. Some feel that the level should be high enough to help prevent excessive loss from the bearing. The amount of grease placed in the hub cavity is left to the discretion of the operator but *don't overfill.* Overfilling is harmful since the expansion of grease resulting from temperature rise during operation can create enough pressure to force the grease past seals on to the brake lining. Also the spinning of the wheel around a stationary spindle will create a whipping action in the grease. This whipping will aerate the grease, further expanding its volume, working the grease unnecessarily to create heat and impose a drag on the wheel. Whipping and aeration may cause texture, color, and consistency changes in many greases.

Proper wheel bearing lubrication is important from an operating standpoint since bearing failures not only cause expensive road calls but may also lead to accidents.

Conditions Which Can Affect Wheel Bearing Lubrication and Performance

TABLE IX

1. Inadequate cleanliness.
2. Bearing parts dropped.
3. Bearing parts distorted or chipped in removal of installation.
4. Bearing parts damaged by contact with wrong type of surface. (Use soft, clean, lintless cloth.)
5. Seals damaged by dragging wheel on spindle in removal of mounting.
6. Use of dirty or wet air to dry bearings.
7. Spinning bearings with air while drying.
8. Handling of contact surfaces when dry. (Body acids.)
9. Failure to inspect and repack bearings immediately after drying.
10. Inadequate inspection. Use of bearing showing spalling, flaking, rust, excessive wear, brinneling, loose or misaligned cups in hubs and presence of bits of old grease, dirt, chips, and cleaning solvent.
11. Use of mismated parts. Replace whole bearing (cup and cone) when one part fails.
12. Use of bad or wrong type of seal or omitting altogether.
13. Improper seal installation.
14. Poor wheel bearing or wheel design.
15. Improper bearing adjustment. Too loose or too tight.
16. Use of wrong grease, dirty grease (usually user's fault), and mixing of greases.
17. Improper lubricant application.
18. Insufficient repack frequency for type of service.
19. Dragging brakes.
20. Overfilling of wheel hub cavity.

SUMMARY

It may be noted that as new bus and truck equipment designs materialized, fuels and lubricants were concurrently developed to meet the new requirements. Fifty years ago when both the automotive and petroleum industries were in their infancy new advances were made independently. All concerned soon recognized that lubricants are the blood streams that maintain the life of moving mechanisms and that fuels can cause engine indigestion and give rise to mechanical ills. As a result there has been a constantly increasing closer association and cooperation between the petroleum and automotive industries in providing for new designs and proper care of existing equipment.

The quality, dependability, and outstanding performance characteristics of modern fuels and lubricants are the result of extensive research, careful laboratory testing, and long periods of service operation under a wide variety of conditions. However, if these products are not used properly, all of the time, money, and effort spent in developing them is wasted.

The most important phase of preventive maintenance, to attain the ultimate goal of satisfactory, economical performance and long vehicle life, is the application of the right amount of the proper lubricant at the right place and time.

personal mention

C. G. Muench

CARL G. MUENCH'S retirement as senior vice-president has been announced by The Celotex Corporation.

An authority on fibreboard manufacturing techniques, Mr. Muench has been associated with the insulation board industry since 1910. In 1920 he joined a group that organized the present Celotex Corporation. He was responsible for the designing and building of the machinery and plant at Marrero, La., which he managed for many years.

Mr. Muench has held the position of vice-president and director of The Celotex Corporation since its organization. He will continue as a director of the corporation.

A retirement and an appointment were announced recently by H. G. Farmer, technical service director, Universal Atlas Cement Company, a subsidiary of United States Steel Corporation.

O. H. GOSSWEIN, technical service manager, Chicago, is retiring after an outstanding career of more than 35 years service with the cement company.

ROBERT H. CLORE, technical service engineer, was appointed technical service manager, succeeding Mr. Gosswein.

Born in Lafayette, Ind., Mr. Gosswein attended Purdue University in that city and graduated with a degree in civil engineering. His career with Universal Atlas began in 1917 as a field engineer. In 1930 he became technical service manager, a position which he held until his retirement.

Mr. Gosswein is a member of the Western Society of Engineers, the American Concrete Institute, the Chicago Engineers' Club and the Chicago Association of Commerce. Many of Mr. Gosswein's technical papers on cement and concrete have been published.

Mr. Clore holds a B.S. degree in civil engineering from Purdue University. In 1937, he joined Universal Atlas as correspondent in the Chicago technical service bureau. He was assigned to field work as a technical service engineer in 1939.

J. G. STEMPLES, former merchandise manager for lathing and plastering material of United States Gypsum Company, Chicago, was recently elected president of Powell Steel Products Company, Chicago, and its manufacturing subsidiary, Lehigh Western Steel Products Corporation, manufacturer of plastering accessories.

ROSCOE R. BUSH has recently been appointed manager of purchases and advertising of Pacific Coast Aggregates, Inc., San Francisco, according to R. K. Humphries, president and general manager.

PARKER S. DUNN was elected vice-president in charge of production and engineering at the Trona, Calif., plant of the American Potash and Chemical Corporation.

RONALD E. DANIELS, vice-president and secretary of Federal Portland Cement Company, Buffalo, N. Y., was recently elected president of the National Mineral Wool Association.

C. O. FUTTERER, regional dealer sales manager of United States Gypsum Company, Chicago, since 1951, was named director of the newly created research office.

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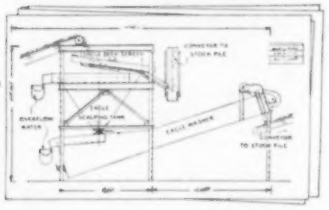


• Once you have used Eagle Fine Material Washers, Classifying and Dehydrating units, Eagle Coarse Material Washers or Eagle Log Washers, you will learn their many advantages, benefitting increasingly as you become familiar with their operation.

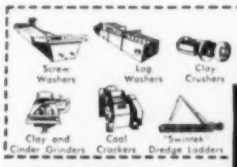
Eagle's "Follow Through" Engineering Helped This Kansas Producer

• Consumers Sand Co., Topeka, Kansas, was flooded out in the 1951 Kansas flood. Undaunted, they rebuilt their plant . . . better than ever, because the new plant, a pumping operation, includes an Eagle 16' Water Scalping Tank with split collecting flume and an Eagle Fine Material Washer — Classifier — Dehydrator.

• The area Eagle distributor got the facts and Eagle engineers made their recommendations. Equipment was installed with the help of "follow through" engineering, including layout prints. Result: a highly efficient, profitable plant.

• A coarse gradation of sand is scalped from the tank, which also removes excess water. A fine gradation is produced by the Eagle screw unit.

• Gravel is processed in a log washer. Oversize is scalped off at suction pipe discharge atop the plant. Eagle "Follow Through" Engineering can solve your problem . . . if it involves materials washing and classifying.



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PIT AND QUARRY

● Torque Converters

The line of torque converters manufactured by the Torcon Corporation, Ashtabula, Ohio, has been expanded to include 11 to 26 in. wheel diameters to meet the needs of medium-heavy duty applications. With a wide range of sizes in the line the choice of a converter can be made on the basis of work cycle and engine life as well as on engine speed and horsepower. The smallest model is designed for use with engines rated from 30-80 hp. and the largest with 150 to 600 hp. Each size is available with or without a cut-off clutch.

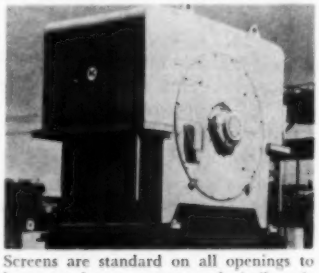
The single-stage three-element converters combine a hydraulic torque converter and a hydraulic coupling in the same unit. The transition from the converter range to the coupling range is automatic.

This line has been designed to meet the needs of shovels, draglines, tractors, lift trucks, drill rigs, road machinery and industrial locomotives.

● Weather-Protected Motor

An outdoor weather-protected motor for major auxiliary drives has been brought out by Allis-Chalmers, Milwaukee 1, Wis.

The motor is designed to keep wind-driven heavy moisture out of its windings. Intake velocity has been reduced to less than 600 f.p.m. so rain drops cannot be drawn into the motor. Cooling air moves upward through side intakes into an expanded air space where its velocity is further reduced. Rain gutters with drains to the ground are provided at the sides of the air intakes so that drops will not accumulate around the openings. The air intakes are located some distance above the ground to be away from dust, and air filters can be installed if needed.

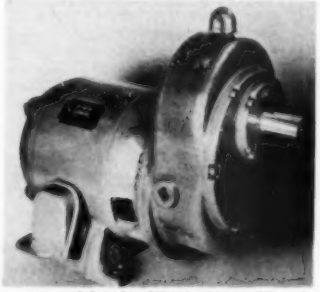


Screens are standard on all openings to keep out leaves, paper, and similar air borne items.

Ventilating air enters around the sides of the motor and goes to the ventilating fans at the end of the rotor. The rotor and stator are cooled in the conventional manner, with the discharge air passing out directly beneath the stator core. No special foundations are needed for this motor.

● Gearmotor

A single-reduction gearmotor in ratings from 0 to 30 hp. and in speeds of 780 to 420 r.p.m. Classes I and II, has been



announced by the Westinghouse Electric Corporation, Pittsburgh 30, Pa.

The "Lifeline" gearmotors use single-reduction gears which permits the use of small high speed motors for delivering power to slower speed applications. These motors are suggested for use with mixers, agitators, fans, and pumps.

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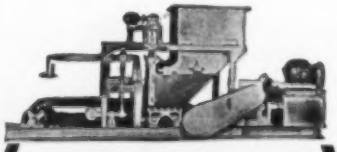

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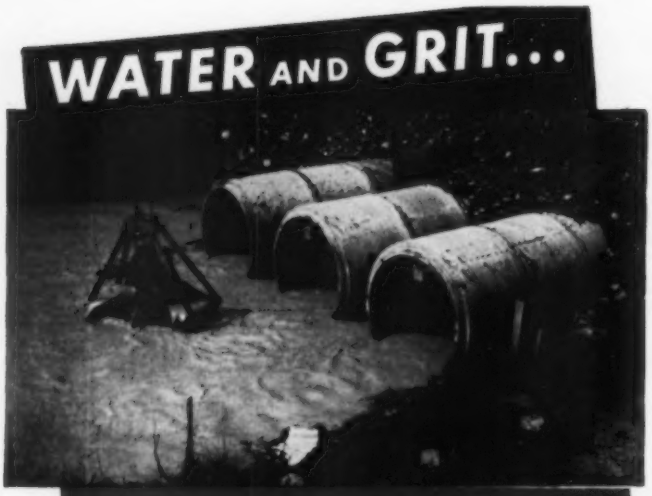

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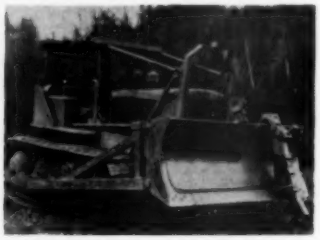
● Dozer-Rooter

A dozer-rooter attachment has been brought out by Electric Steel Foundry Company, Portland 10, Ore.

The device is a heavy duty tooth shank housing which mounts on the moldboard of a bulldozer by means of a special clamp used in combination with adapters



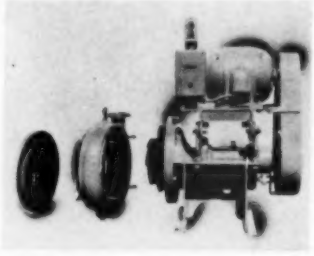
and saddles which enable it to fit most popular makes of dozers. The rooter shank has four depth adjustments below the dozer cutting edge and is equipped with "Esco" box type points. The rooters can be attached singly or in pairs.

Use of the device enables the tractor to root, doze and rip at the same time. It is easily mounted and dismounted without special tools. The dozer-rooter is suggested for ripping of overburden, cutting seamy rock, punching out boulders and making initial cuts in solid rock.

● Solids Handling Pump

A solids and acid handling pump that is available as a rubber lined or all metal type in sizes from 2 to 8 in. is being manufactured by the Galigher Company, 545 W. 8 Street S., Salt Lake City, Utah.

Called "Vacseal" these pumps have a vacuum-seal principle that prevents fluids or solids from being forced into the packing gland. The impeller is a disc with pumping vanes on one side and smaller auxiliary vanes on the reverse side.



The auxiliary vanes produce a vacuum on the shaft seal and prevent solids from cutting the shaft or packing.

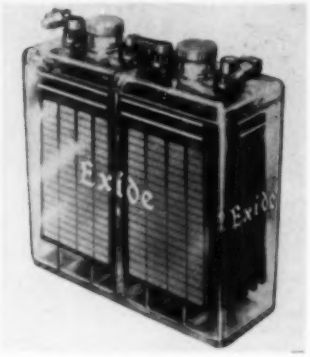
These pumps are designed to handle abrasive and corrosive pulps, slurries, sludges, tailings, concentrates, sand and gravel, cement and similar materials. The rubber lined models have the lining vulcanized to the metal and will operate on heads up to 100 ft. All-metal pumps will handle heads to 150 ft. Special liners of neoprene and other materials are available.

● Industrial Batteries

Industrial batteries with transparent plastic cases have been placed on the market by The Electric Storage Battery Company, Philadelphia 1, Pa.

The new line, "Exide-Tytex, Type Coe," are claimed to have highly sustained voltages and long life with reduced operating and maintenance costs. The new batteries are said to be dependable under all operating conditions, with greater output per unit of space, and less weight per ampere-hour output.

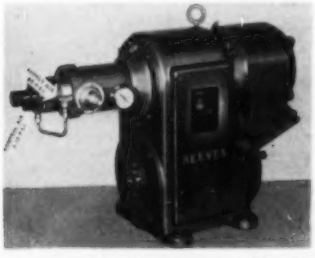
The batteries have colored pilot balls that indicate the state of charge and solution lines marked on the transparent



polystyrene container show the recommended upper and lower levels of electrolyte. The plates have an interlocking rib and bar design for strength and greater surface area, white porous rubber separators and slotted polystyrene sheets and Vitrex retainers hold the plates and active material in place. These batteries are made in two- and three-cell design with a capacity rate of 10 to 30 ampere-hours. Units may be combined to give any power output in the range and any required voltage. They are suggested for emergency lighting circuits, communications, laboratories, and other stationary uses.

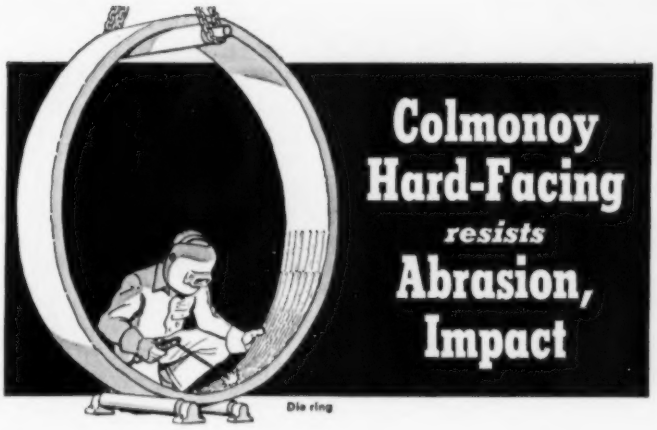
● Flow and Liquid Control

A control for use in conjunction with instrumentation air pressure of 3-15 p.s.i. on Vari-speed Motordrives for controlling liquid level in tanks and for automatically controlling flow proportioning systems of liquids, gas, etc., as well as pressure and



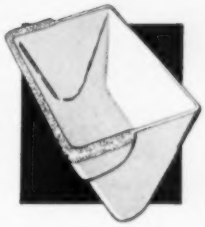
temperature has been announced by the Reeves Pulley Company, Columbus, Ind.

The "Conoflow" control cylinder is mounted on the drive and connected to a pneumatic controller.

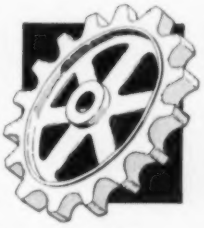


The examples shown here speak for themselves: Colmonoy meets every hard-facing need with a good alloy and an easy way to apply it.

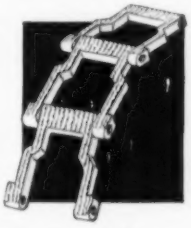
DIE RING, above, is an excellent example of the use of Colmonoy No. 1 in resisting impact and abrasion. More and more Colmonoy is being used on this and other 'rough' applications, where earth and bulk materials are handled. Colmonoy Special No. 1 is used where abrasion factors outweigh the value of impact resistance. Both alloys are applied easily by electric arc.


Elevator bucket

ELEVATOR BUCKET LIPS withstand the most extreme wear when hard-faced with Colmonoy Sweat-on Paste. Applied with a spatula, and fused with carbon-arc welding, its hardness of 68-72 Rockwell C gives the utmost in abrasion resistance. Thin sections can be hard-faced with a minimum of distortion by spreading Sweat-on Paste with a brush, and fusing with an oxy-acetylene torch.


Drive sprocket

DRIVE SPROCKETS are best protected with Colmonoy No. 6. Colmonoy No. 6 will give unmatched service on this abrasive application, and it has the unique advantage of being easily formed during its plastic range (1900°—2050° F). After applying Colmonoy No. 6 by oxy-acetylene welding, the deposit is hot formed with a simple die. Excess deposit is wiped off with a cast iron rod. It will outlast hardened steel by four times.


Drag chain links

DRAG CHAIN LINKS last longer when hard-faced with the newest iron-base alloy, Wallex. Available in bare and coated rods, Wallex has excellent abrasion resistance, and very good impact, corrosion, and galling resistance.

The applications mentioned above are but a few of hundreds that have proved the value of Colmonoy alloys in extending equipment service life.

Write for Colmonoy Hard-Facing Manual No. 77. It gives a two-page hard-facing guide and a complete table on the properties of all Colmonoy alloys.

HARD-FACING ALLOYS

19345 JOHN R STREET **WALL COLMONOY** DETROIT 3, MICHIGAN
CORPORATION

BRANCHES: BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON
NEW YORK • LOS ANGELES • PITTSBURGH • MONTREAL

SYNTRON

Controlled "Vibration"

BIN VIBRATORS
Make Stubborn Materials Flow Freely

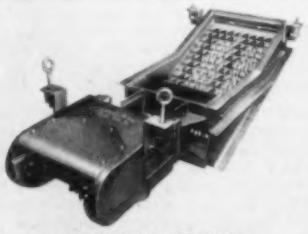
VIBRATORY FEEDERS
Finger-Tip Control of the Rate of Bulk Material Flow

For Material Handling Efficiency

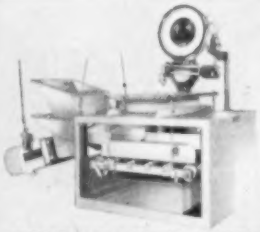
Free-flowing bins, hoppers and chutes—variable control of material flow, feeding from pounds to hundreds of tons per hour—coarse separation and scalping—weigh feeding and batching—of bulk materials, hot or cold, dry or damp, coarse or fine—add up to faster processing at lower costs.

Syntron Electromagnetic Vibration without the use of wearing mechanical parts such as spiral screws, cams, etc., assures cheaper operation and low maintenance.

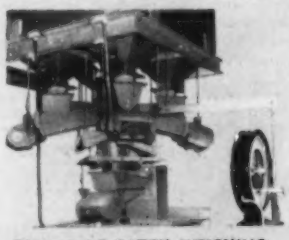
VIBRATING GRIZZLIES
Both Feed and Scalp With One Unit



VIBRATING SCREENS
Wet or Dry — Single or Multiple Decks



"CONSTANT WEIGH" FEEDERS
Accurate, Continuous Feed by Weight



"Automatic" BATCH WEIGHING Scale—Controlled Vibratory Feeders

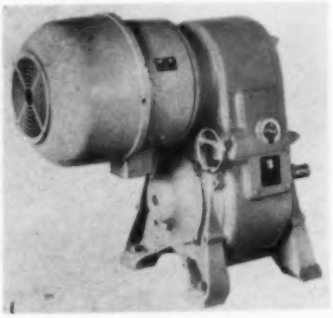
Write for Your FREE Copy — Syntron Catalog No. 519

SYNTRON COMPANY
385 Carson Avenue Homer City, Penna.

● Variable Speed Drives

The variable speed drives made by Sterling Electric Motors, Los Angeles 22, Calif., are now being offered in totally enclosed fan-cooled models.

The fan-cooled models have a dual cooling system which provides internal and external cooling. The air inside the



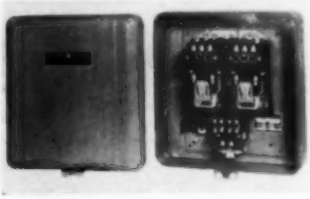
motor is circulated by an internal fan over the motor windings and through openings in the stator and around the inside of the motor housing. An external fan forces air from the atmosphere around the motor housing and removes the heat left there by the internally circulating air.

The variable speed drives sold as "Speed-Trols" are made in the range of 20-25 hp. with 2-1, 3-1, and 4-1 speed variation.

● Throwover Panel

An automatic throwover panel that transfers electric circuits to an emergency power source when there is a failure of the regular power supply has been brought out by General Electric, Schenectady 5, N.Y.

The panel consists of mechanically interlocked normal-source and emergency-source contactors and a pilot contactor. These contactors transfer circuits from



the normal to the emergency power source and back again upon resumption of the regular power. They also control standby power equipment such as auxiliary generators turning them on and off when necessary.

The panel can also be equipped with a volt-sensitive relay to transfer the load when voltage regulation becomes poor, or with a time-delay relay to prevent switching from momentary current interruptions as from lightning.

These panels are suggested for emergency lighting circuits, fire protection apparatus, and regulating and continuous process machinery uses.

● Safe Fuse Panel

A fuse panel that features a disconnect method for de-energizing the fuses on motor controls has been developed by the Electric Machinery Manufacturing Company, Minneapolis 13, Minn.

The "Sa-Fuse" panel is movable with the current-limiting fuses mounted on the face. The panel has disconnecting blades

behind it. When the fuse compartment door is opened the fuse panel is automatically pulled forward and the fuses disconnected. They can then be changed safely and easily. Interlocks prevent the fuses from being disconnected when the motor switch is closed, and prevent closing the motor switch when the fuse panel is open. The door can be locked with the fuse panel in either the connect or disconnect position.

● Heavy Duty Tractor

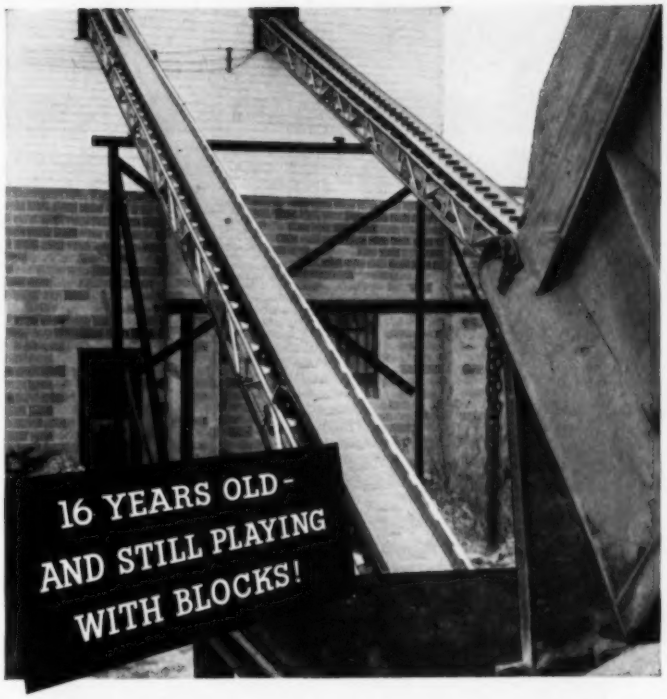
A heavy duty crawler tractor, the "OC-18" is now being marketed by the Oliver Corporation, Chicago 6, Ill.

This model features an over-center clutch that runs the full width of the dashboard; air steering; push button electric starting; cold weather starting

aid; center-positioned gear shift; and parking brakes. The tractor has been designed for maximum ground contact and develops 126 drawbar hp.

The tractor has high clearance for operation in mud or over stumps, rocks, etc. A line of allied equipment is available for this model.

The Industrial Truck Division, Clark Equipment Company announced the appointment of a new authorized dealer in the state of South Carolina, the Lukas Equipment Company, 1804 Blanding Street, Columbia, S. C.



Original Farquhar Conveyor Sells Cement Block Maker on Six More!

The Farquhar Conveyors you see here (handling aggregates from receiving hopper to storage hopper) are just two of seven bought by Seberger's Concrete Block Co., Gary, Indiana, in the past 16 years. Complete satisfaction with the original conveyor (still on the job after 16 years) was one of the biggest reasons for the purchase of the other six. In the owner's own words, "This satisfaction has always been reaffirmed in subsequent purchases. Farquhar Conveyors provide high capacity units at reasonable investment and subsequent low maintenance cost. Your service facilities have always been excellent!"

Whether you move coal, gravel, sand, aggregates, cartons, boxes, bundles, bales, or any kind of bulk or packaged materials—horizontally or from floor to floor—Farquhar can cut *your* handling costs to rock bottom! One or more of the complete line of Farquhar portable, semi-permanent and permanent power-belt or gravity conveyors will solve your handling problem. Our engineers will be glad to consult with you . . . at no obligation!

OLIVER

Farquhar CONVEYORS

POWER-BELT AND GRAVITY CONVEYORS

FREE! "Owners Report"—book of case histories showing typical money-saving conveyor installations.

MAIL COUPON FOR YOUR COPY

A. B. FARQUHAR COMPANY
Div. of The Oliver Corp.
Dept. D-36, York, Pa.

Gentlemen:
Please send me my free copy of "Owners Report."

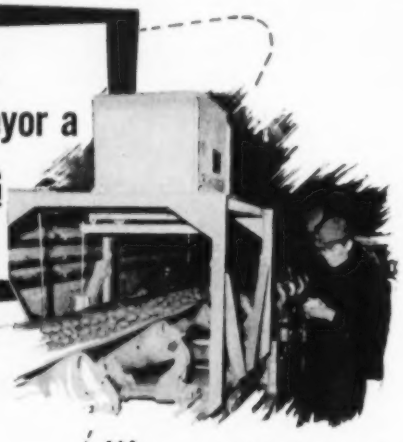
Name .....
Firm .....
Address .....
City ..... Zone ..... State .....

trade notes

The Fuller Company, Catasauqua, Pa., has established a branch office in Seattle, Wash. The new office is located at 120 Sixth Avenue, North, and will be under the supervision of Marius W. deBruyn.

W. C. Caye and Company, Inc., 787 Windsor Street, S.W., Atlanta, Ga., has been appointed distributor for the C. S. Johnson Company, Champaign, Ill., for the state of Georgia except 24 southeastern counties.

Make your Belt Conveyor a WEIGHING Conveyor!



Some of the Materials Weighed by the ...

TRANSPORTOMETER

Asbestos
Cement
Chemicals
Clay
Coal and Coke
Coffee Beans
Flour
Fruits
Hydrated Lime
Limestone
Ores
Pharmaceuticals
Paper Pulp
Sand and Stone
Sewage Sludge
Soap Powders
Sugar
Sulphur
Super Phosphate
Tobacco
Vegetables
Uranium

Wherever you use belt conveyors, you can weigh and record the flow of materials by installing the

TRANSPORTOMETER®

Installed at any point on a belt conveying system, the Transportometer makes any conveyor an automatic, continuous weighing and totalizing station. The Transportometer employs a completely mechanical, gear differential integrator which automatically and continuously records on a direct-reading tonnage totalizer, the product of belt speed and the momentary weight on the suspended idlers.

AUTOMATIC — No supervision after calibration.

ACCURATE — 99½% or better, regardless of belt speed or tonnage.

EASILY INSTALLED — Unit supplied ready for mounting on new or existing belt conveyor, without removing or changing conveyor structure, at any conveyor inclination.

LOW MAINTENANCE COST — Negligible wear because of Transportometer design ... and the lowest maintenance cost of any comparable equipment.

Let us show you how the Transportometer can improve your processes by accurate weighing, via conveyors, in the handling, storing and supplying of raw, intermediate and finished products.

TRANSPORTOMETER DIVISION
SINTERING MACHINERY CORPORATION
130 SINTER AVENUE, NETCONG, N. J.

A distributorship agreement has recently been signed by Service Engineering Company, Inc., 2910 East 15th Street, Tulsa, Okla., with Worthington Corporation. The firm will handle Multi-V-Drives and Allspeed Selectors, according to the announcement.

Alfred K. Althouse and Richard James III, have joined the Alloy Rods Company, York, Pa., as field representatives, it was announced.

Mr. Althouse will be field contact man with distributors in Pennsylvania, New York, and the New England States, and will headquarter in Philadelphia. Mr. James will be field contact man with distributors in the States of Michigan, Ohio, Indiana, Kentucky, and Tennessee, making his headquarters in Cleveland.

A. K. Althouse

R. James III

Appointment of Herbert V. Evans Jr., as district manager at Wilmington, Dela., has been announced by Alloy Steel Products Company, Inc.

For the past five years Mr. Evans has been sales representative at Pittsburgh, Pa. Prior to that time he was with the Lebanon Steel Foundry and with Anti-Corrosive Metal Products.

H. V. Evans

Mr. Evans will concentrate on direct selling activities in the Wilmington area but will also have general supervision over the Pittsburgh territory which he formerly covered.

Replacing him as sales representative in the Pittsburgh area is E. J. Lickwar.

Five engineers have received promotions at Worthington Corporation according to an announcement.

John E. Lancaster has been appointed assistant chief engineer, Air Conditioning and Refrigeration Engineering Division.

William C. Osborne has been appointed manager, Research and Development Department.

Norman L. Meyerson has been appointed assistant manager, Research and Development Department.

Frederick C. Gilman has been appointed research engineer.

T. A. Herman has been appointed assistant chief engineer, Reciprocating Engineering Division.

C. R. Boll Jr.

The appointment of C. R. Boll Jr. to the position of general sales manager, Cummins Engine Company, Inc., Columbus, Ind., was announced recently. He will be responsible for Engine, Parts and Contract Sales, the Company Regional organization, Advertising and Sales Development.

Until his promotion, Mr. Boll was manager—Engine Sales. He started at Cummins in 1941 as a sales engineer following his graduation from Purdue University.

Baldwin-Lima-Hamilton Corp., Eddystone, Pa., has appointed Lewis A. Hester, manager, Locomotive Sales with headquarters at Eddystone, Pa. Prior to his new position, Mr. Hester was associated with Westinghouse Electric Corporation, as manager of its Transportation Department for the Middle Atlantic District.

A. D. Bellows

A. D. "Al" Bellows, formerly crusher sales engineer for the Austin-Western Company, has been appointed sales manager, Crusher Department, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, it was announced recently.

Mr. Bellows assumes his new position with nearly ten years of Crusher sales and engineering experience with the A-W Crusher Division, which has been moved to the Lima plant as a result of the recent consolidation with Baldwin-Lima-Hamilton Corporation.

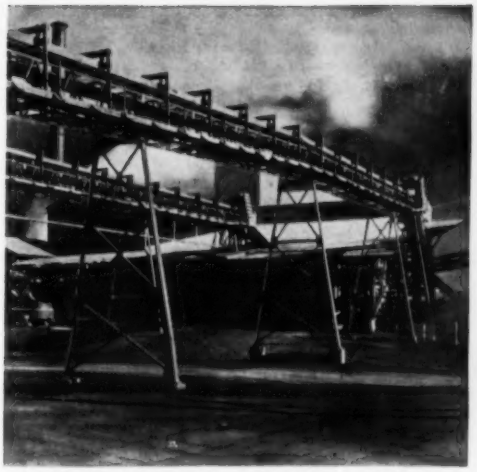
Miller Machinery Company, Missoula, Mont., has been appointed sales representative for the Straub Manufacturing Company, Oakland, Calif. The company will cover the states of Montana and Idaho.

H. F. Ziegler

The appointment of Herbert F. Ziegler Jr. as manager of the Kansas City, Missouri, District Office of Sterling Electric Motors, Inc., has been announced.

He is a native of Kansas City and a graduate of Notre Dame University. After service in World War II as Lieutenant j.g. in the Navy, he took postgraduate work at the University of Fribourg in Switzerland.

HEWITT-ROBINS



A "Packaged Unit" to Meet Your Belt Conveyor Needs

The HEWITT-ROBINS SECTIONAL BELT CONVEYOR

Easy to Assemble ***Pre-Engineered***

Strongly Constructed

Here is the complete belt conveyor that will meet the requirements of both small and large operators handling bulk materials.

Easy to Assemble: Your own men can assemble, disassemble, move, extend or shorten it quickly and easily.

Take Your Choice: Select the right belt conveyor to fit your own particular needs—you have a choice of 3 types of drives—wide selection of intermediate truss lengths—your choice of idlers—(4", 5" or 6" diam.)—4 belt widths (18", 24", 30" or 36") in lengths up to belting limitations.

Factory-Assembled Units: All truss side members are factory-welded as complete units and are jig-drilled for easy erection—head and tail units completely assembled with machinery in place.

Standard Equipment: Self-cleaning, protective decking for return strand supplied for the entire conveyor line.

Optional Equipment: Hood covers—easily attached loading hopper.

Only Hewitt-Robins is able to take single unified responsibility for a belt conveyor installation—only Hewitt-Robins manufactures both machinery and belt.

Get the complete story. Write for Bulletin No. 132-A.

HEWITT-ROBINS HR **INCORPORATED**
STAMFORD CONNECTICUT

Hewitt Rubber Division
Hewitt Rostfoam® Division
Robins Conveyors Division
Robins Engineers Division

The Jeffrey Manufacturing Company, Columbus, Ohio, announces the following changes in its Home Office personnel: C. W. Hawley, formerly sales manager of the Products Engineering Division, has been named manager of original equipment sales, Merchandise Division. He recently returned from six months with N. P. A. in Washington where he was Chief of the Conveyor Section.

L. L. Grooms

C. W. Hawley

Replacing Mr. Hawley as sales manager, Products Engineering Division is Lester L. Grooms, who has had a varied career in engineering, sales and estimating since he first came with the company in 1916. He spent time in the Cleveland office in the thirties, and returned to the home office as engineer for the Chain Sales Division.

Kessler-Simon Machinery Company, 1545 Exchange Avenue, Oklahoma City, Okla., has been appointed distributor for the Schield BANTAM Company, Waverly, Ia., for truck-mounted power cranes, draglines, shovels, back hoes, clamshells, pile drivers and magnet cranes.

William M. Taylor has been named manager, Export Department, Quaker Rubber Corporation, Division of H. K. Porter Company, Inc., Philadelphia, Pa. it was announced. He has been merchandising manager and will continue his duties in the department as well.

John Hellstrom, vice-president of American Air Filter Company, Louisville, Ky. has been appointed director of sales of all AAF and Herman Nelson products. He will return from San Francisco, where he organized and managed the Company's Pacific Division.

The Sales and Advertising Departments of the Herman Nelson Division, Moline, Ill. are to be moved to Louisville and all sales will be under the direct supervision of Mr. Hellstrom. Assisting him will be Robert W. Nelson, V. P., formerly of the Herman Nelson Division.

H. R. Stickel has been named assistant to the president of The White Motor Company in charge of public relations and national fleet sales, it was announced. He has been fleet sales manager for the past seven years.

Appointment of John Pearson as district representative for Hyster Company was announced. He will work in the field out of the Peoria office.

A. O. Williams

The appointment of A. O. Williams as director of engineering, Industrial Truck Division, Clark Equipment Company, has been announced. Mr. Williams will coordinate and lead all engineering activities in the field of material handling equipment.

Mr. Williams graduated from the University of Michigan in 1914. He began his career in 1917, when he brought to the company a design and patent for the manufacture of a locking-type differential for highway trucks. He now holds ninety patents for mechanisms in the railroad and industrial truck fields. In 1920, as Chief Engineer and assistant to R. J. Burroughs, then Vice President in charge of engineering, he helped design and produce the first gas-powered platform lift-truck on which the company founded its material handling equipment business.

Opening of special factory training courses in servicing Euclid earthmoving equipment was announced by The Euclid Road Machinery Co., Cleveland, Ohio.

The school is open to representatives of equipment distributors, customers and others that may be interested, and will offer four beginning and four advanced courses of one week each.

"RUGGED INDIVIDUAL" OF A PUMP

"TELL-TALE"
New Type C
Centrifugal
Sand and Gravel Pump

Built STRONGER to last LONGER

New BULLETIN sent on Request

YOUR PUMPING TROUBLES ARE OVER after you install this husky, smooth-working unit. It's designed and constructed for long, high-economy service under all operating conditions. Strong, one-piece stands with self-aligning SKF bearings reduce vibration and wear. Larger impeller hub minimizes breakage and shut-downs.

Now offered in the 6" size, with either semi-steel or "best-in-the-long" run Ni-Hard working parts. Other sizes soon available.

PEKOR IRON WORKS, INC.
LOCK DRAWER 909 ESTABLISHED 1892 COLUMBUS, GEORGIA

L. E. Copple

Lee E. Copple has been named sales manager of the Construction and Mining Equipment Department of the Sterling Division, The White Motor Company, it was announced recently.

Mr. Copple has been off-highway tire sales manager for the Firestone Tire and Rubber Company, Akron, and previously had been merchandising manager for Von Hamm-Young Co., Ltd., Hawaii, and district manager for Firestone in Hawaii.

W. N. Shepard

The promotion of Whiting N. Shepard to director of sales of the Boston Woven Hose and Rubber Company, has been announced. As sales director, Mr. Shepard has the responsibility for all marketing activities of the company.

He joined Boston Woven Hose and Rubber Co. after 19 years with the Plaskon Division of Libbey-Owens-Ford Glass Company, Toledo, Ohio.

legal decisions

By LEO T. PARKER

Attorney at Law

Cincinnati, Ohio

You can't win a law suit unless you have the law "on your side". In other words, readers of PIT AND QUARRY who conduct their business haphazardly and without knowledge of modern law, cannot *prepare* to win unavoidable suits. Therefore these persons cannot expect their lawyers to win suits already lost.

During the past September, the writer traveled in several Western states and talked personally with numerous owners, operators, and employees in plants which produce and sell nonmetallic products. I found that few of these persons take precautions to avoid expensive law suits. Nevertheless, during these conversations a great deal of interest was shown in acquiring legal knowledge on various important points of the law, and many legal questions were asked. Obviously, the following answers, based upon leading higher court decisions, will assist readers to prepare to win law suits.

Attractive Nuisance

Several operators of quarries and sand-and-gravel pits, asked these questions: "What can we do to avoid damage allowances for injuries to children who trespass on our property? Can we avoid liability?"

The answer is: If you have on your property anything that naturally attracts children, you must either employ a guard to prevent children from trespassing on your property, or construct barricades or fences to prevent the children from entering the property.

It is well settled that an adult trespasser is not entitled to damages for an injury not wilfully inflicted by the owner of the property. However, as also indicated, the situation is different with respect to children, because any person who maintains a dangerous appliance or hazardous premises *likely to attract children* is expected by the law to exercise ordinary care to prevent injuries to them.

For instance, in *Arrington v. Murphy*, 149 S.E. 549, it was disclosed that a family rented a camp adjoining a gravel pit. A child in the family was injured when he fell into a pit filled with water, and the father filed suit for damages.

During the trial, it was argued that since there was no path between the father's lot and the gravel pit, the children were trespassing and, therefore the father was not entitled to damages for the injuries to his child. Since the testimony showed that the owner of the pit had machinery on the premises which naturally attracted the children, the court held the father of the injured child entitled to damages, saying:

"The defendant (pit owner) was charged with notice that these children were only 11 steps away. While there was no pathway or walkway at the place, still these children were attracted by the machinery and sand pit, and could not be reasonably held as trespassers, in a legal sense, because they came up to the bank out of curiosity and peeped over the edge into the sand pit."

Law of Patents

A reader asked these questions: "Is there any legal liability if an inventor continues to mark his invention 'Patented' after the patent has expired? What does 'Patent Pending' mean when stamped on an invention?"

Answer: There is no legal liability, if after a patent has expired, a patentee continues to mark his manufactured articles "Patented", followed by the date on which the patent was issued. If the date of the patent is included in the notice, observers are informed truthfully and may readily determine that the patent

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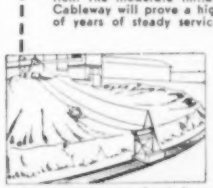
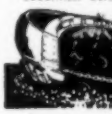

Sauerman Scraper Stockpiler

Sauerman Slackline Cableway



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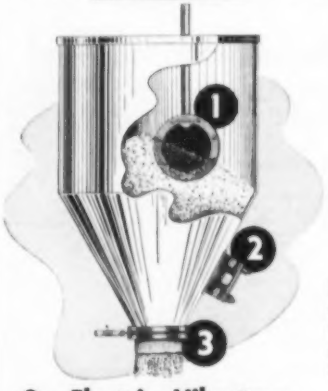

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is ineffective after its term of 17 years has expired.

The term "Patent Pending" means that the inventor filed an application for a patent, but that the patent has not yet been granted.

The penalty for falsely marking articles "Patented" is a fine of $100 for each offense, with other stipulations. However, the law does not prescribe a penalty for the use or misuse of the terms "Patent Applied For" or "Patent Pending". These terms have been adopted by inventors without legal authority, although the proper use of them is considered by higher courts as being lawful.

Of course, no person can be held liable for infringement of an invention marked or stamped "Patent Applied For" or "Patent Pending" because no one is liable for infringement until after the patent is granted and issued.

Patent Held Infringed

Another reader asked this question: "Can a manufacturer avoid infringement of a patent by making a variation or change in the patented device?"

The answer is no. A mere slight variation or change does not avoid infringement of a patent unless the new invention has considerable advantages over the old invention. In other words, if, in a different way, a manufacturer accomplishes the same result as a patentee, he is an infringer.

For example, see the leading case of *Crozier-Straub v. Maryland Concrete Corporation*, 39 F (2d) 126. Here it was disclosed that an inventor obtained a patent on a concrete block comprising one-sixth cement, water, and coal cinders or ashes which are first crushed or ground to a consistency composed of pieces not larger than ¾ inch and retaining all of the smaller sizes and the dust and fine ashes, which are otherwise ordinarily thrown away as refuse. The process of crushing the material separates the coarser pieces or lumps to enable the cement to penetrate through their pores and bind the entire mass in a homogeneous body.

The inventor claimed that an advantage of the invention is that owing to the absence of sand or other similar mineral material, the finished blocks retain the porous light qualities of the original cinders to a very considerable degree, while at the same time having the necessary strength and resistance to crushing strains.

Another manufacturer attempted to avoid infringement of the patent by using screens to separate the dust from the ashes and then crushing the large clinkers, which were then mixed with water and cement to form building blocks.

The owner of the patent sued the manufacturer for damages. The latter contended that no infringement resulted because he separated the cinders into two portions through a screen, and the subsequent mingling of equal portions of the fine and coarse material distinguishes his process from that of the patent whose specification requires that *all* of the smaller sizes and the dust and fine ashes shall be used so that the original mass of cinders and ashes "remains in the resulting mixture without

separation or change of proportion".

Notwithstanding this argument, the higher court held the manufacturer liable for infringement, saying:

"It seems clear, however, that the mere separation and recombination of the cinders would not of itself constitute a great or substantial departure from the patented process . . . If the entire mass of material substantially as it comes from the furnace enters into the mixture from which the blocks are formed, infringement *would not be avoided* by merely separating the refuse into two portions, according to size, grinding the coarser material so that the pieces would not exceed three-quarter inch size, and immediately thereafter recombining the two parts. It would still be true that the original mass would remain in the resulting mixture without real separation or change of proportion, and enter into the finished product."

Law of Contracts

A reader asked this question: "What is a good and dependable legal rule to determine whether a contract is enforceable? I make many contracts, but never know for certain whether I can enforce them. Also, is a contract or agreement enforceable if a financially responsible person guarantees to pay another person's account for purchased materials?"

The courts have consistently held that a valid, legal and enforceable contract is an agreement between two or more parties by which each party is expressly or impliedly obligated to do something, not prohibited by law, within a specified time. In an expressed contract, the terms of the agreement are stated in so many words, but an implied contract is a condition where the contractor *presumes* or *implies* that one of the contracting parties is obligated to perform a service for the other.

It is interesting to know that the higher courts have established the rule that either an expressed or implied contract is valid and enforceable if these facts are present: (1) one of the contracting parties submits an offer which the other party unconditionally accepted; (2) both parties have certain obligations to perform; (3) the object of the contract is legal; (4) both parties are sane and of legal age; (5) the quantity and quality of the merchandise is clearly stated; (6) the contract does not violate a state or city law; (7) neither of the parties practiced fraud or deceit.

Certain kinds of verbal contracts are equally as valid and enforceable as written ones. On the other hand, there are many kinds of contracts that should be in writing.

For example, a contract relating to the sale of real estate, to long-term leases of real property, and to the sale of certain kinds of chattels must be in writing, otherwise the contract is void. Moreover, a contract by which a person or firm guarantees the account of another, or guarantees performance of any agreement is required by law to be in writing. However, ordinary contracts for the purchase of nonmetallic materials are valid. For example, if a man comes to a seller with a prospective purchaser and says: "Let this man have $1,000 worth of material and I will pay for it", this is an enforceable contract because *he is primarily* liable and personally assuming the debt. But if he says: "Let this man have $1,000 worth of material and *if he does not* pay for it, I will", the seller cannot hold him liable on the agreement, because it is a surety contract, and the law requires that such contracts *must be in writing.*

Hence, according to this rule of law, any person who makes a verbal statement which may be construed by a seller of nonmetallic materials to be a *primary* and personal obligation to pay, results in the contract being valid and enforceable.

For example, in *Enos v. Owens Slate Co.*, 176 Atl. 121, it was disclosed that the owner of a motor truck was trucking slate for a slate company from a quarry. He was unable to get his pay, and he stopped work. Soon afterward an official of the quarry company said to the truckman:

"You go ahead and draw the slate and I will see that you get your pay."

The slate company failed to pay the truckman, who filed suit against the official to recover the amount due him. The counsel for the official argued that no liability existed because the agreement by the official to pay was not in writing. However, it is interesting to know that the higher court held the official bound to pay the truckman, and said:

"We think there was evidence warranting the inference that the defendant (official) intended to become primarily bound for the hauling sued for, and that the plaintiff (truck owner) had a right

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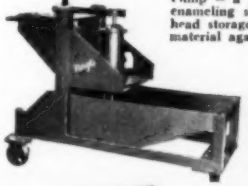

LEFT: Nagle portable Combination Sump and Pump — a 1½" type SW-OB handles porcelain enameling slips and glazes from mills to overhead storage — 33 g.p.m. of 1.9 specific gravity material against 50' head.

RIGHT: Nagle 2" type SW-OB, frame 95 J Hastalloy pump mounted in a Hastalloy vessel, handles sulphuric acid saturated with chlorine from a low pressure reactor. This single stage inverted entrance pump is for wet pit submerged operation. Has dual radial bearings and balanced shaft.

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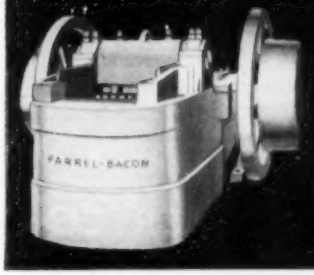

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to and did so understand it."

This court explained that the official would *not* have been liable if he had said to the truckman: "You go ahead and draw the slate, and *if the company does not* pay you, I will pay you".

Such a statement would *not* have been a personal obligation of the official, but a surety contract which never is enforceable unless in writing.

Zoning Ordinance

A reader asked this question: "I operate a sand-and-gravel plant in the city limits. A new zoning ordinance restricts my section for residents only. I want to install new machinery in my plant. Can I do so now that this new zoning ordinance has been passed?"

The answer is: Yes, you can install new machinery which conforms with your "existing" use of the premises.

For illustration, in *De Felice v. East Haven*, 32 Atl. (2d) 635, it was disclosed that a person named De Felice is owner of a 12-acre tract of land in a city. He has for many years utilized it as a commercial sand pit. The city's zoning and building inspector rejected Felice's application for a permit to install a wet sand classifier on this land. De Felice appealed to the court.

During the trial, testimony was given which proved that for many years the land owned by De Felice had been used for extracting sand and gravel by *ordinary* methods. Therefore, the question presented the court was whether the use of the wet sand classifier involved an "extension" or merely a *modification* of the existing uses of the property.

The court held that substitution of more modern and efficient apparatus is not a modification of existing uses and therefore does not violate the zoning ordinance. This higher court also held that no zoning ordinance can prevent a property owner from taking earth products from his land. However, if a sand pit or a quarry is in a residential district, the owner may be prevented from operating the plant in a manner objectional to nearby property owners. See *Haller Company*, 295 Pac. 257, 261.

Theft of Barriers

Considerable discussion has arisen from time to time over the legal question: "If a contractor places barriers, red lights, flares, etc., at a street excavation, is the contractor liable in damages if someone steals the barriers and an innocent person is injured?"

According to a late higher court decision, the answer is yes, if the jury refuses to believe the contractor's testimony.

For example, in *Schwoerer v. City of Philadelphia et al.*, 74 Atl. (2d) 755, it was shown that a contractor dug a ditch in a street for installation work. That night an automobile driver was seriously injured when he drove his car into the ditch. He sued for damages. During the trial, he (driver) proved that there were no barriers, lights, or warning of the ditch, although after the accident there were found two unlit red lamps on the cartway near the ditch.

The contractor testified that he had placed barriers and red lights at the ditch, but someone had stolen them. However, the jury did not believe this testimony and held the contractor liable in heavy damages to the injured automobile driver. The court said:

"Thus Leva (contractor) offered evidence that lights and a barrier had been placed, that the barrier and lights had disappeared some 15 minutes before the accident; but the jury was not bound to accept the testimony, and it did not."

Federal Income Tax

Another reader asked the question: "I have my retail supply business in the town of Wilton and my home is in another town 15 miles distant. When filing my federal income tax return, can I deduct my traveling expenses going to and from my home and place of business?"

The answer is: An official of a corporation or another employee *cannot* deduct from his gross annual income the expenses incurred when traveling or performing services or working in a town or city different from his residence.

For example, in *Albert v. Commissioner of Internal Revenue*, 15 T.C. No. 51, the testimony showed facts as follows: One Albert had legal residence in Gloucester, Mass. He took a position with a corporation at Lowell, Mass. For 21 weeks during the year, Albert had a hotel room at Lowell. Also, he had meals in Lowell on 122 days during the year at a total cost of $366. He expended during that year $64.26 in train fares between Gloucester and Lowell, when he went to Gloucester over week-ends to be with his family.

The court refused to allow Albert to deduct any of these expenses.

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Docket 89152 (1)—Proposed to establish on lime, common, hydrated, quick or slaked, carloads, minimum weights 30,000 lb. and 50,000 lb. from Ludington, Mich., to the following points in Michigan:

	Minimum 30,000 lb.	Minimum 50,000 lb.
Sheboygan,		
Ypsilanti	29	23
Rochester	28	23

Docket 89161 (2)—Proposed to establish on stone, dolomite, raw or crude, washed or not washed, having value for chemical purposes only, in open-top cars, carload minimum weight marked capacity of car used from Carey, Ohio, to East Lake, Mich., 231 cents per net ton.

Docket 89179 (1)—Proposed to establish on crushed stone and crushed stone screenings, straight or mixed carloads, in bulk, in open-top cars only, minimum weight 90 percent of the marked capacity of the car used, from Marblehead, Ohio, to Erie, Pa., 219 cents per net ton.

Docket 89180 (2)—Proposed to establish on limestone, ground or pulverized, unburned, in closed cars, carloads, minimum weight 30 tons from Bloomington, Ind. (and group), to Peoria, Ill., 282 cents per net ton.

Docket 89193 (1)—Proposed to establish on limestone, agricultural, unburned, in bulk, in open-top cars, carloads, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Piqua, Ohio, to Napoleon, Ohio, 177 cents per net ton.

Docket 89202 (1)—Proposed to establish on stone, crushed, in open-top cars only, carload minimum weight 90 per cent of marked capacity of car, except that when car is loaded to full visible capacity, actual weight will apply from Plum Run, Ohio, 158 cents; Melvin, Ohio, 165 cents; Greenfield, Ohio, 146 cents, Marble Cliff, Ohio, 171 cents; Marion, Ohio, 189 cents net ton, to Teays, Ohio. On shipments of crushed stone having origin, destination, and entire transportation within the state of Ohio, handled in closed equipment on demand of shippers, the rate will be 115 percent of the rates for open-top cars.

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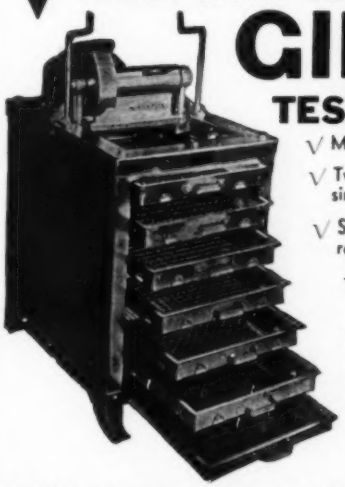

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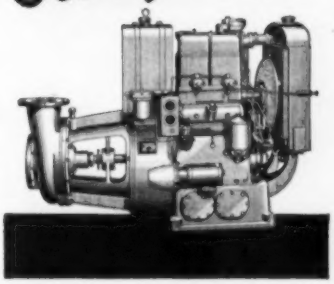

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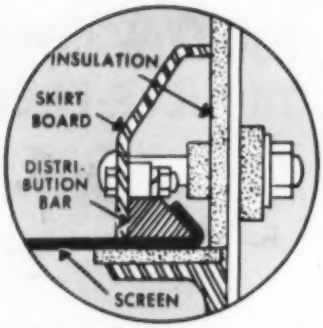

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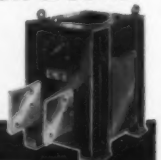

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GENERAL FREIGHT TRAFFIC COMMITTEE EASTERN RAILROADS

Bulletin G-6680 (Carrier)—Proposed to establish on lime, common, hydrated, quick or slaked, carload from Ludington, Mich., to Merrimac, Wis., 27 cents per hundredweight, minimum weight 30,000 lb. and 23 cents per hundredweight, minimum weight 25 tons, subject to ExParte 175 increase.

Bulletin G-6682 (Shipper)—Proposed to establish on limestone, natural, ground or pulverized, minimum weight 30 tons, from Black Rock, Buffalo (East Ferry St.), Buffalo (Louisiana St.), Buffalo (Main St.), Buffalo Lake, and East Buffalo, N. Y., to Fort Dodge, Iowa, (A) $5.83 N. T., (B) $6.32 net ton, subject to ExParte 175 increase. (A) Rate applies in open-top cars not protected by tarpaulin or other protective covering. (B) Rate applies in closed cars or open-top cars protected by tarpaulin or other protective covering. Note. Rates named herein will also apply on limestone, ground or pulverized, when containing not in excess of 3 percent of other minerals either physically or otherwise added.

Bulletin G-6695 (Shipper)—Proposed to establish on dolomite, roasted, carload minimum weight 50 tons from Millersville, Gibsonburg, and Woodville, Ohio, to Rio Grande Crossings, that is, Brownsville, Eagle Pass, El Paso, Hidalgo, Laredo, and Presidio, Tex., 42 cents per 100 lb., subject to all increases.

Bulletin G-6696—Proposed to establish on dead-burned magnesite, refractory, in granular form, clinkered and burned to a dead state, carload minimum weight 30 tons from Manistee and Stronach, Mich., to Owensboro, Ky., 41 cents per 100 lb., subject to ExParte 175 increase.

Bulletin G-6698 (Carrier)—Proposed to establish on fluxing lime, not ground, in bulk, carload minimum weight 30 tons, from Strasburg Junction, Va., to Verona, Pa., $4.15 per net ton, subject to ExParte 175 increase.

Bulletin G-6728 (Shipper)—Proposed to establish on dolomite, roasted (refractory dolomite, in granular form, treated or untreated, clinkered and/or burned to a dead state) carload minimum weight 90 percent of marked capacity of car from Narlo and Maple Grove, Ohio, to Kansas City, Mo., $7.64 per net ton, subject to ExParte 175 increase.

ILLINOIS FREIGHT ASSOCIATION

Docket IRC 511—1199 (MRP 6354)—Proposed to establish a rate of 99 cents per ton of 2000 lb. on sand, gravel or crushed stone, in open-top cars not covered with tarpaulin or other protective covering, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, but not less than 30 tons, from Joliet, Ill., to Gurnee, Ill. Present rate, $2.02 per ton. Rate subject to ExParte 175 increase.

Docket IRC 511—1191A—Proposed to establish a rate of 101 cents per net ton from Lehigh, Ill., and 117 cents per net.

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METAL FRAME Latest style spectacle with single bridge. Have Hi-Line temples with a "dressy" look. Also available with sideshields. (Non-flammable plastic frame Style WKS shown at top.)

CHOOSE YOUR FAVORITE LENSES FOR
Super-Tough®
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ANY WILLSON SPECTACLES
Three popular types of lenses are available for all Willson Spectacles. Clear glass Super-Tough®, Willsonite® Green Super-Tough® and the new Plas-Tough® lenses that combine the impact resistance of heat-treated glass with the comfort of lightweight plastic.
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See your Willson distributor or write for Catalog

WILLSON PRODUCTS, INC.
102 Thorn St., Reading, Pennsylvania

ton from Thornton, Ill., to Champaign, Ill. These rates are subject to ExParte 175 increase, will be subject to an expiration date of December 27, 1952, and will apply only on crushed stone meeting specifications for bituminous concrete, having maximum gradation of not less than 95 percent passing 1-in. screen and not more than 10 percent passing No. 10 mesh screen.

Docket IRC 511-1201—Proposed to establish on lime rock, limestone or chats, broken, crushed or ground, straight or mixed carloads, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Marlo, Mosher, and Ste. Genevieve, Mo., to Plainfield, Ill. Present: combination of locals. Proposed: in closed cars, $2.82 per ton; **in open cars, $2.65 per ton,** subject to ExParte 175 increase.

Docket IRC 511-1214—Proposed to establish a carload rate on sand and gravel from Cairo, Ill., to Carbondale, Ill., of 90 cents per net ton, subject to X-175-B increase of 12 percent to expire one year from effective date unless sooner cancelled, changed, or extended.

Docket IRC 511-1215—Proposed to establish carload rates of 72 cents per net ton from Anna, Ill., to Carbondale, Ill., and 77 cents per net ton from Ullin, Ill., to Carbondale, Ill., both rates to be subject to X-175-B increase and to expire one year from effective date unless sooner cancelled, changed, or extended, on crushed stone, as described in Rule 20, I.C. Tariff 13321-J.

PACIFIC SOUTHCOAST FREIGHT BUREAU

Docket X 3077 (S)—Request rate of 21 cents from Midland and 23 cents from Plaster City, Calif., to March Field, Calif., on plaster, etc., taking column B rates, item 150 series, Pacific Southcoast Freight Bureau-A, carload minimum 20 tons.

Docket X 3086 (S)—Request rate on stone, natural, rough, quarried or crushed, carload Cedar City, Utah, to Mentone, Calif., 31 cents per hundredweight, minimum 50 tons.

Docket 3105 (S)—Proposed to establish on gypsum, crude, crushed, ground, or powdered, carload, Cedar City, Utah, to Los Angeles area points, minimum 50 tons, that is 28 cents in open cars and 30 cents in closed cars.

Docket 3110 (S)—Sand, carload, from Saline, Utah, to Geneva and Ironton, Utah, $1.50 per net ton, minimum 50 tons.

Docket 3136 (S)—Request rate of 50 cents, minimum 50 tons, on stone, rough, carload, from East Ely, Nev., to Los Angeles, Calif.

NORTH PACIFIC COAST FREIGHT BUREAU

Docket NC-1949 (Sup. 7) (S)—Proposed to establish on limestone, crushed, ground or powdered, from Cooper, Wash., rate per 100 lb., minimum 50 tons, to Philomath, Wrens, Kingston, and Sweet Home, Oreg., 18 cents. Blogett, Summit, and Lyons, Oreg., 19 cents.

Are you getting these

Bonus Benefits

of Red-Strand Wire Rope

QUALITY? . . . Hercules Red-Strand wire rope *consistently* delivers top tonnage. It increases labor savings through less frequent replacement.

Are you getting these bonus benefits? They are yours as a result of Leschen's exacting insistence upon higher-than-rated quality and specialized Leschen craftsmanship.

Leschen wire rope specialists will help answer this quality question . . . to your profit. Ask them.

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In business only to make better wire rope since 1857.

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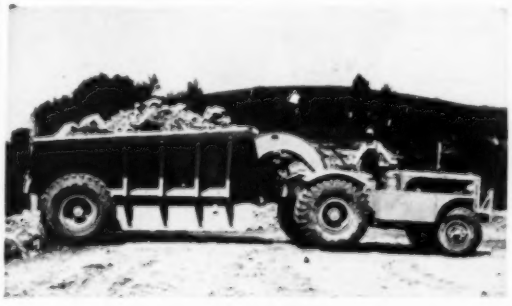
UNLOAD...

THE WHOLE LOAD

Quickly — Safely!

Are you giving "free rides" to "load-hangers"? The LANDIS revolutionary, new, smooth-surface trailer bed eliminates load-hanging. Dump the *whole* load! This means less cost; faster, smoother operation.

Now, the LANDIS trailer's twin hydraulic lifts dump the entire load in one smooth operation.



The LANDIS 11.1 yard off-highway end-dump trailer ready to unload.

You can get end, side or bottom dump and safe, sure, positive connection with instant response. Remember: a LANDIS FLEET is an economcial, effective, dependable fleet!

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Write today for information on how LANDIS can help you haul for less!

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Change to the best bit type for the job
right on the job!

Both TIMKEN® *rock bit types fit the same drill steel!*

YOU can change to the most economical bit for the job as the ground changes—right on the job—if you're using Timken® interchangeable rock bits. Both Timken carbide insert and multi-use bits fit the same drill steel.

When drilling in ordinary ground use Timken multi-use bits. With correct and controlled reconditioning, they give you the lowest cost per foot of hole when full increments of steel can be drilled.

When you hit hard, abrasive ground, quickly change to Timken carbide insert bits for greatest economy. They're your best bet for maximum speed, constant-gage holes, small diameter blast holes and very deep holes.

By using Timken carbide insert and multi-use bits, you put the right answer to every drilling problem right at your drillers' finger tips. Both bit types are interchangeable in the same thread series. And both types give you these three big advantages: 1) made from electric furnace Timken fine alloy steel, 2) threads are not subject to drilling impact because of the special shoulder union developed by the Timken Company, 3) quickly and easily removable.

Call upon the 20 years' experience of our Rock Bit Engineering Service for help in selecting the best bits for your job. Write The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN

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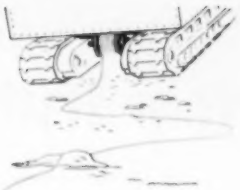
your best bet for the best bit
. . . for every job

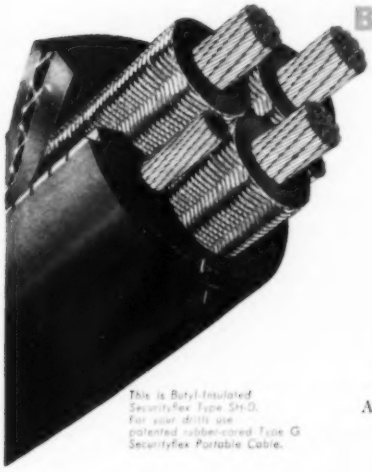


proved in **our** mines
for better performance in **yours**

We—at Anaconda—are miners ourselves. We know shovel cable because we use lots of it. Safety and uninterrupted flow of power are important in any mining operation. In both respects we know Securityflex® Type SH-D has a good record.

for longer "failure-free" service on big shovels, insist on

Butyl-Insulated Securityflex above 2kv



This is Butyl-Insulated Securityflex Type SH-D. For your drills use patented rubber-cored Type G Securityflex Portable Cable.

ANACONDA Securityflex Cable is safer, less liable to "blow-out," easier to work with. Here's why:

BUTYL INSULATION. This accounts for improved resistance to moisture, ozone, heat (up to 80C).

NEOPRENE JACKET. Here is real flexibility and great strength engineered for this specific tough use. Handles well, has high impact resistance and lasts longer in all weather.

RUBBER-CORED GROUND WIRES. This safety-first feature prevents kinking, gives greater shield contact, and cushions the wires.

COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other ANACONDA portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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the right cable for the job ANACONDA® **wire and cable**

Help Truth Fight Communism

FREEDOM-GRAM

DO YOU LISTEN TO RADIO FREE EUROPE? I HOPE YOU DO, FOR I AM ONE OF MILLIONS OF AMERICAN CITIZENS WHO HAS VOLUNTARILY CONTRIBUTED TO BUILD THESE STATIONS, WHICH BRING TRUTH TO YOU WHO ARE DEPRIVED OF IT.

IN AMERICA MILLIONS REGULARLY PRAY FOR AN UNDERSTANDING BETWEEN OUR PEOPLES. PLEASE ADD YOUR PRAYERS TO OURS. SURELY OUR COMMON FAITH IN GOD IS THE PLACE WHERE HOPE FOR FREEDOM BEGINS.

I AM A (occupation)_____

NAME_____

ADDRESS_____

Sign and Mail this FREEDOM-GRAM today
Let it flash words of hope behind the Iron Curtain

THE SAMPLE Freedom-Gram above can be your message of truth and hope to the enslaved millions behind the Iron Curtain.

Your signature and those of millions more Americans are needed *now* on Freedom-Grams such as this. Millions of these personal messages will be sent to the Communist-dominated people behind the Iron Curtain as pledges of our common hope for a free world.

This year the Crusade for Freedom is endeavoring to raise $4,000,000 which will be used to support Radio Free Europe and Radio Free Asia.

These stations are playing an important part in the fight to win the cold war—and avert the hot war. Already the Communists are desperately trying to stop the steady stream of truth which is penetrating the Iron Curtain. They are failing, and will continue to fail as long as these powerful stations are kept on the job. Will you help in this most important of campaigns?

Mail above Freedom-Gram to Crusade for Freedom, c/o your Local Postmaster, enclosing any contribution you wish to make. You may receive grateful replies. If you should be unable to translate them, free translations may be obtained by forwarding them to the same address. Send your Freedom-Gram today!

Help Truth Fight Communism
Give to Crusade for Freedom

ONE SIMPLICITY FINISHING SCREEN HELPS PRODUCE 1500 CUBIC YARDS OF RAILROAD BALLAST DAILY FOR MORRIS KNUDSEN CO., INC.

When Morris Knudsen Co., Inc., one of the nation's largest contractors, goes into the production of a new rock products commodity, there's usually some pretty fine equipment on the job. So it's not surprising to find a Simplicity Finishing Screen at work in their new Blaisdell, North Dakota, plant for the production of gravel railroad ballast. This plant produces over 1500 cubic yards of finished ballast every day, using a 4' x 14' Simplicity Triple Deck Screen to screen out plus 1½" material for return to the crusher and also to size and separate the minus 1½" to plus ¼" product. Simplicity equipment can improve your operations, too. Write today for full facts.

110

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Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND, MICHIGAN

increases hourly yardage output over 10% with Koehring *fast-shuttling* DUMPTORS

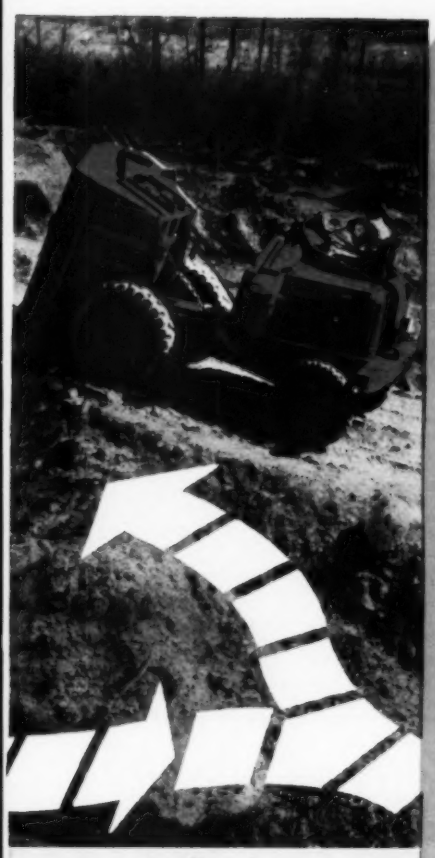
THERE is no need to turn at the loading unit, along narrow haul roads, or on the fill with fast-shuttling 6-yard Dumptors. Koehring constant-mesh transmission gives the same 3 fast speeds forward and reverse, lets Dumptors operate with equal ease in both directions. Every turn saved cuts 15 seconds off your cycle time, and adds up to an important increase in yards hauled per hour. Here's a typical example:

On a 1,000-foot haul, eliminating only 2 turns saves ½ minute every round trip. Where you would get an average of 13.6 trips per hour with 2-turn operation, Dumptor *no-turn shuttle hauling* gives you 15.4 trips — an increase of 1.8 trips an hour on the same 1,000-foot haul.

Fast, easy spotting and 1-second gravity dump help keep production high. Costs stay low because there are no complicated, mechanical body hoists to slow up haul cycles — no expensive hoist maintenance or down time to eat into your profits. Let your Koehring distributor show you Dumptor's many other cost-cutting advantages.

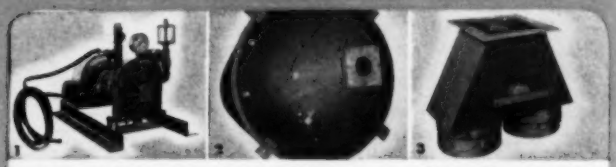
KOEHRING COMPANY, Milwaukee 16, Wis.
Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

KOEHRING DUMPTOR®



This mountain-side job shows typical no-turn shuttle advantage. Hauling along narrow ledge, Dumpster spots close to Koehring 1½-yd. 605, gets its load, drives to fill, dumps, returns to shovel — without turning.

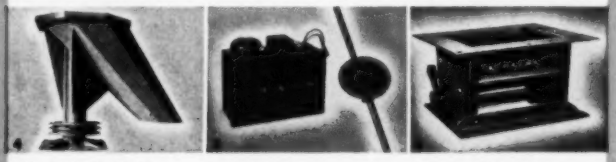
INCREASE BATCH PLANT PROFITS
with Johnson accessories



Rotary Vane Compressor gives 7 cu. ft. air pressure per min. cement aeration. 15-lb.-limit relief valve.

Aeration Fittings properly spaced in Johnson bins and silos keep cement free flowing.

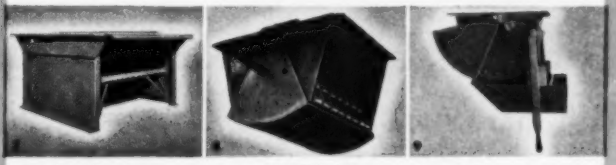
2-Way Elevator Discharge Valve, a flap-type chute, directs flow of cement to the storage tank.



Pivoted Distributor feeds aggregates to bin sections. Positions and locks by ground control wheel.

Bin Signals accurately register high and low levels in cement or aggregate. Dust-proof.

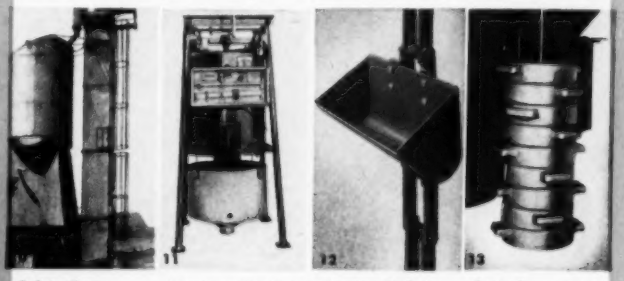
Rotary Plug Valve accurately controls cement flow. Plug operates freely in self-aligning bearings.



Receiving Hopper 30 and 50-bbl. sizes, feeds bulk cement to elevator. All-welded, weather-proof.

Aggregate Fill Valves single clam, radial type for jam-proof closing. Hydraulic pressure lubrication.

Tunnel Gate for stockpile reclamation. Single radial clam. Skirt board is hinged, opens and locks securely.



Safety Cage of 28" steel, welded to casing, can be furnished with all Johnson elevators.

Water Weigh Batchers, semi- or full-automatic types. 120 and 240-gal. sizes available.

Elevator Buckets in many sizes for aggregates, and cement. **Steel Chain** has carburized knuckles.

Batcher Test Weights in sets of nine, 50-lb. calibrated units, and two 25-lb. steel hangers.

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Send us literature on items checked: 1 2 3 4 5 6 7 8 9 10 11 12 13

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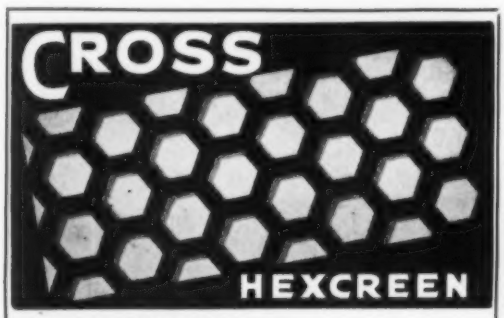

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DEPENDABLE

CROSS DIE-PERFORATED SPECIAL ANALYSIS STEEL PLATES FOR AGGREGATE SCREENING EQUIPMENT PROVIDE

PLUS PERFORMANCE AT MINIMUM COST

Descriptive Literature on Request

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CROSS ENGINEERING COMPANY

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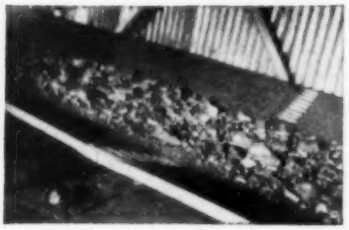
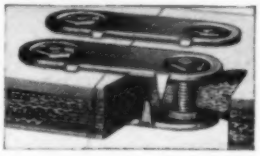
FLEXCO ®

BELT FASTENERS and RIP PLATES



FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.



Compression Grip distributes strain over whole plate area

★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO.
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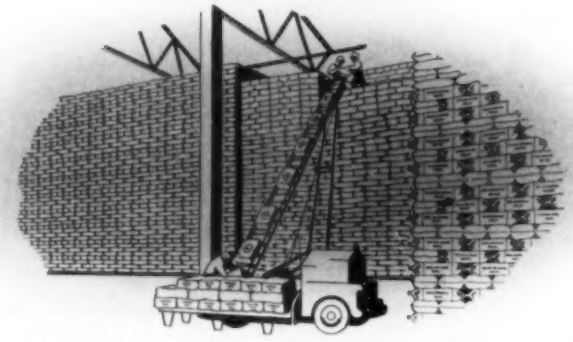
PASTED VALVE TYPE

SEWN VALVE TYPE

OPEN MOUTH PASTED BOTTOM

OPEN MOUTH SEWN BOTTOM



Here are a few reasons for the steadily increasing demand for Hammond Multi-Wall Bags:

1. Papers and materials of highest quality are used in Hammond Multi-Walls.
2. Hammond's two large plants are devoted almost exclusively to Multi-Wall Bag production.
3. Pride of workmanship—thorough knowledge of your shipping problems assure you of finest Bags for your needs.
4. Modern machines and materials handling equipment keep costs and prices to a minimum.

Write for your copy of "To Serve You Better with Hammond Multi-Wall Bags".

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For Heavy, Exposed Gears Sinclair Jet Lubricants . . .

Have Extreme Pressure Quality!

Retard Wear!

End galling of gear teeth!

Will *not* thin out at high temperatures!

Maintain lubrication at frigid temperatures!

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Stretch application schedules for hard-to-reach gears!

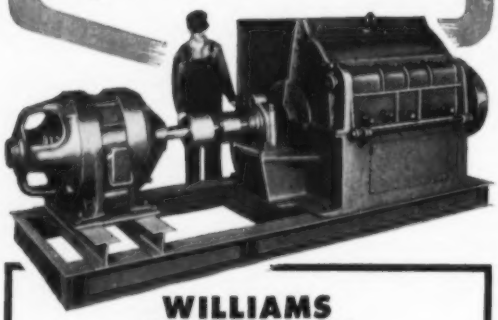
Help to lower power consumption!

Do *not* require heating for application!

Save you money!

Learn more about ALL-WEATHER Sinclair JET LUBRICANTS and how they can help in your heavy-duty work. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N.Y.

Only One Operation To Crush 6" Stone To Agstone Or Smaller!



WILLIAMS SECONDARY HAMMER MILLS

For speed and stepped-up output in reducing rock of 6" size to agstone — or down to 20 mesh if required — Williams secondary hammer mills are in a class by themselves! Capacities range up to 75 tons per hour. Hundreds of installations have proved them outstanding profit-makers!

Extremely heavy rib-reinforced construction — manganese steel liners and breaker plates — easy adjustment to compensate for wear — double duty hammers — metal trap for tramp iron — instant access for service — these and many other features make the low cost Williams Hammer Mills top paying investments!

Many Sizes For Any Requirement

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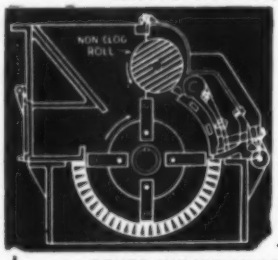

NON-CLOG ROLL MECHANISM

The best way to handle wet, sticky clay or shale direct from pit for quick grinding without clogging. Roll is attached to hopper opening. Can be driven off main pulverizer shaft if desired.

OTHER WILLIAMS EQUIPMENT

ROLLER AND IMPACT MILLS with Air Separation for grinding to 325 mesh or finer . . . HELIX-SEAL MILLS for dustless or wet grinding . . . DRYER MILLS . . . AIR SEPARATORS . . . VIBRATING SCREENS . . . COMPLETE "PACKAGED" PLANTS ready to install.

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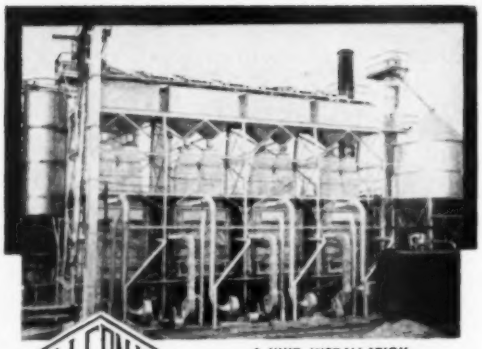
OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD



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CALCINER

For Burning LIMESTONE, DOLOMITE, etc.

2 SIZES AVAILABLE

PREHEATS - CALCINES - COOLS

AUTOMATIC CONTINUOUS OPERATION

MINIMUM FUEL CONSUMPTION

There are extra dividends available in the operation of your plant when you use Ellernan Calciners . . . let us explain the exclusive features . . . write today for literature and detailed information applicable to your operation.

THE ELLERNAN CO.
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with BUDA dyna-swirl Diesels . . . the engines that give you more horsepower hours per dollar. There's a BUDA Diesel for every type of equipment. Write for illustrated Bulletins. The Buda Company, Harvey, Illinois.

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Jet Action is fastest in QUARRYING too

ROCK BITS
for Rotary Drilling

Quarries like VAREL ROCK BITS for their—

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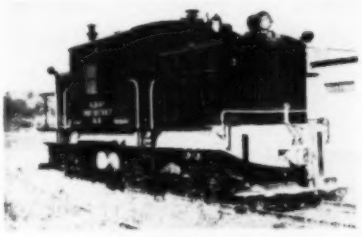

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GAS-ELECTRIC
SWITCHING LOCOMOTIVES
Equal to New!

- 48 Ton—18 Car Capacity
- Standard Gauge
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Bag Packer

Quickly fills self-closing bags to the desired weight. Saves time in filling and eliminates need for sewing or other expensive bag closing equipment.

The AUGER-MATIC Bag Packer has a multi-twist auger which can quickly be changed to pack any material from powder to pellets.

AUGER-MATIC Packing reduces dirt and waste . . . a time and labor saver. Packer can easily be moved from one filling point to another.

Send for descriptive literature.

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throughout the life of the screen

When Hendrick Perforated Plate is used on vibrating and shaking screens, not only does the mesh remain uniform throughout the life of the screen, but the screen gives economically long service.

Furnished either flat or corrugated, its full clearance practically obviates clogging, and the ease with which decks can be changed minimizes labor costs.

Hendrick perforated plate can be supplied in the proper gauges of high carbon and stainless steels, with any desired shape and size of perforations.

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Manufacturing Company

39 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

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LUBRIPLATE LUBRICANTS Cut Parts Replacements 50%

The Northern Pacific Transport Company writes us:— "*Since using LUBRIPLATE Lubricants, our overhaul periods are stretched from 50,000 to 100,000 miles, and repair parts bill cut 50%.*" LUBRIPLATE Lubricants will show you startling savings in parts and increased production.

1. LUBRIPLATE reduces friction and wear
2. LUBRIPLATE prevents rust and corrosion
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Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
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Newark 5, N. J. Toledo 5, Ohio

The Different LUBRICANT!

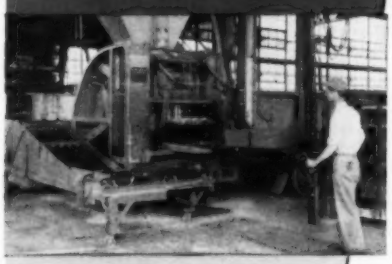
DEALERS EVERYWHERE, consult your Classified Telephone Book

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT & QUARRY

Life began... with STEARNS 15

Large, Super-Efficient, Architecturally-Perfect, All-Stearns Plant in Louisville, Ky., Well Satisfied with New 15's Increased Production of Quality Blocks That More Than Meet Every Trade Requirement.



Here is the *heart* of one of the most efficiently operated concrete block plants in America at Louisville, Ky.—the *fully automatic, vibratory, plain pallet Stearns 15* with pneumatic off-bearer and automatic pallet return, installed last July. Operator is James Ray. Contractors within a 50-mile radius and U. S. Government Engineers as far away as Fort Knox have learned to depend upon this company's blocks for their unvarying, high load-bearing strength, low moisture absorption and good looks. The Ready-Mix Company also operates a 50-cu. ft. Mixer and a Yard Hoist, both Stearns.

R-M READY-MIX CONCRETE COMPANY

October 15, 1952

Stearns Manufacturing Company, Inc
Adrian, Michigan

Gentlemen:

Life began in July, 1952, for Ready-Mix Concrete Company of Louisville, Kentucky, on the arrival of our new, one-man Stearns 15.

The new "15," equipped with pneumatic off-bearer and automatic pallet return, has proven very satisfactory from every standpoint. Our downtime has been reduced to a minimum; our production has increased appreciably, and the quality of our blocks from the standpoints of low-absorption and high compressive strength more than meets every trade requirement.

We have experienced absolutely no mechanical difficulty with the machine during its first three months of operation, and, because of Stearns' reputation for prompt parts replacements and efficient personal service when needed, we feel we have little to worry about on that score.

Cordially yours,

C. E. Bales
Plant Superintendent

Ready-Mix Concrete Company from the air. The plant was designed and built from the ground up in 1948 on a 50-acre, once wooded tract east of the city. The spacious main building, housing the *rugged, dependable, one-man Stearns 15*, is 240' x 90' and built for expansion. Efficiency, cleanliness and employee comfort were "musts" in its construction from *Stearns concrete block.*

STEARNS

MANUFACTURING COMPANY · INC

ADRIAN • MICHIGAN

OWNERSHIP—THE KEY TO SUCCESS!

STEARNS 15 · STEARNS 50 · ZIPPERS · JOLTCRETES · MIXERS · SKIP LOADERS · TURNTABLES · SINTERLITE

"NIFTY" tells how to make a 300,000-block sale!

"Look sharp," the Army says. And that fits me to a T. When you're after big sales, remember—people remark on the clean, true edges and corners of blocks made with Duraplastic. Face texture is richer, too. No wonder I just helped 300,000 Duraplastic-made blocks find a home in the Army!
TEXAS CONCRETE WORKS

"Thrifty" says:

I can help you save a pretty penny on production. Fewer culls and throwbacks... less breakage in handling green products all add up. Manufacturers report real savings with Duraplastic.

WHEN the Texas Concrete Works at Waco landed a whopping order for 300,000 concrete blocks for Ft. Hood, it wasn't surprising. They use Atlas Duraplastic Cement exclusively, manufacturing blocks and pipe. And they know Duraplastic makes better-looking concrete products with increased resistance to passage of water.

YOU'LL FIND—Duraplastic Cement makes a more cohesive, rubbery mix which holds together better, feeds easily through machines. Unsurpassed for concrete block, brick, pipe, drain tile and silo staves.

YET DURAPLASTIC* COSTS NO MORE

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company

PQ D-143

ATLAS®

DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

Makes Superior Concrete Products at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

The CONCRETE MANUFACTURER December 1952

Lightweight Aggregates

SOME six years ago, when we published our first map showing locations of lightweight aggregate producing plants in the United States, we were hard pressed to find as many as a hundred valid producing establishments. The final compilation, in fact, showed only about 80 manufacturing units, almost a third of which were clustered in the state of California. There were no listings at all in 22 of the 48 states.

One important purpose of the map, of course, was to call attention to the extensive areas which had no sources of supply within economical shipping distance. Several months ago, partly as a means of measuring progress, we started work on an entirely new map which has just been published. We knew in a general sort of way that the lightweight aggregate industry had grown tremendously, but we were a little bowled over by the actual findings of our survey. The new map shows 220 sources of supply, or almost three times as many as we were able to verify for the 1947 map. We drew blanks in only nine states; Maine, New Hampshire, Vermont, Connecticut, Rhode Island, Delaware, West Virginia, Mississippi, and South Dakota.

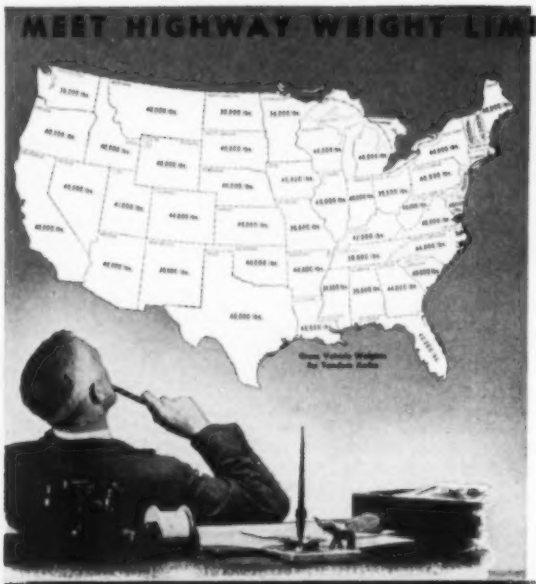
We would like to make just a few observations concerning the accuracy of our data. It was drawn from many sources: from our own PIT AND QUARRY DIRECTORY OF THE NONMETALLIC MINERALS INDUSTRIES; from lists of known producers compiled and sent to us by various district offices of the Portland Cement Association; and from membership lists of the various lightweight aggregate associations. In an undertaking of this kind we are obviously exploring virgin territory, and it would be naive to expect that all *bona fide* producers could be tracked down by the simple expedient of cross checking a number of sources of information, or even that all the data thus gleaned would be unassailably accurate.

So we are certain that there are some omissions and some inaccuracies, and we hope that as many of these as possible will be brought to our attention, so that a corrected list can be published in the near future. We are assured that our 1953 map presents the best information now available on sources of lightweight aggregates, and we believe that it will prove to be a valuable tool in the hands of all who use such materials.

The map lists sources of all primary types of both natural and manufactured lightweight aggregates without any regard to the end uses for which the various materials are best suited. Certain lightweight aggregates which perform excellently in one kind of application may show up poorly in another, and it is assumed that the purchaser will make it his business to learn what performance he may reasonably expect from a particular material when it is used for a specific purpose. In short, as the learned say, *caveat emptor*.

Although the 1953 map shows conclusively that the lightweight aggregate industry has expanded enormously in the past few years, the supply situation is still critical in many areas. There are still only some 35 listings in the important categories of expanded shale, clay, and slate, and prime materials of this type are still generally in short supply. It is to be hoped that this segment of the industry, at least, will continue its recent rate of growth for some years to come—until total productive capacity bears a considerably more realistic ratio to the total needs of the concrete industries.

William M. Avery



Have You Checked the Highway Weight Limits of Your State?

Sooner or later you'll have to face the problem of staying under the highway weight limits of your state. Naturally, you want to take that into consideration when you select your truckmixers. Smith-Mobiles have proper weight distribution that enables you to take full advantage of the allowable weight, either gross vehicle weight or weights on individual axles. These modern truck mixers permit you to carry the greatest possible payload . . . even to the fraction of a yard. And the beauty of it is, gross weight is reduced without in any way compromising with high-quality design, rugged construction and mixer performance. You get the same sturdy Smith-Mobiles . . . each one with an NRMCA rating plate. Write for new bulletin.

3 Ways to Get BIGGER PAYLOADS Legally . . .

1 SMITH-MOBILE with Rear Engine Drive.
Engine moved to rear of mixer, cutting almost 20" off the overall length. Enables you to move your mixer forward, shifting center of gravity and putting a bigger share of the load on the front axle. Gives you better weight distribution without using cab-over or cab-ahead type of trucks. Or, you can use a shorter wheel-base truck and get greater maneuverability. Both engine and transmission are completely accessible. Three Loadlimit sizes, 4½, 5½ and 6½ cubic yards. Higher ratings for agitators.

2 SMITH-MOBILE with Truck Engine Drive.
Mixer Engine eliminated. Weighs about 1300 pounds less than mixer equipped with separate engine. Enables you to mount mixer closer to cab, moving considerable weight from rear to front axle. Utilizes the same two speed transmission as rear engine drive model. One engine instead of two means less fuel consumption and less engine maintenance. Does a good job, even on curb and gutter work. Available for both Loadlimit and Closed-End Models in 4½, 5½ and 6½ yard sizes with higher ratings for agitators.

3 SMITH-MOBILE Trailer Mixer.
Enables you to carry from 8 to 9 yard payloads and still be within highway loadlimits. Most state highway laws allow you to carry about three yards more on a semi-trailer than on a tandem axle. Use of a suitable length trailer allows freedom in mounting mixer to attain proper load distribution. Makes unit easy to maneuver. Also you gain the advantage of having the tractor available for other jobs. Furnished in Loadlimit and Closed-End models in one size only, 6½ yard mixer, 8⅝ yard agitator.

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CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

news of the concrete industries

Shalite Corp. Aggregate Makes Concrete Units Meeting All Specifications

The lightweight aggregates plant of the Shalite Corporation at Beverly, near Knoxville, Tenn., has been supplying a wide area since it started operating in September, 1950. From its extensive deposit of high-grade bloating shale this firm makes a product which meets all specifications. A process is used which includes pelletizing, sintering, and water quenching. The entire operation was the result of a research program carried on jointly by the Tennessee Valley Authority and two local concrete block manufacturers, Southern Cast Stone Co., Inc., and Knox Concrete Products, Inc. Its location on the Southern Railroad provides excellent shipping facilities in all directions.

Tests made by commercial testing laboratories and the University of Tennessee Physical Testing Laboratory show that standard 8- by 8- by 16-in. blocks made with Shalite aggregate will weigh about 25 pounds and will have good strength even on lean mixes which yield over 30 blocks per bag of cement and over 60 blocks per cubic yard of aggregate. In structural concrete a 4:1 loose mix is shown to result in a concrete weighing about 100 lb. per cu. ft. with a strength of at least 4,000 p.s.i. Tests in the laboratory and on jobs have shown strengths of 7,000 p.s.i. with mixes of 3:1 and 3½:1.

Pacific Northwest N.C.M.A. Meets in Portland, Oreg.

The first meeting of a group of block manufacturers of the Pacific Northwest region who are members of the National Concrete Masonry Association was held recently in Portland, Oreg. Twenty-two block producers were represented.

This group is now making plans to have another meeting in Portland or Seattle after the annual N.C.M.A. convention in Cleveland. All concrete products manufacturers in the Pacific Northwest will be invited to attend.

Dallas Lightweight Aggregates Builds $500,000 Haydite Plant

The Dallas Lightweight Aggregate Company, an affiliate of Texas Industries, is constructing a new $500,000 lightweight aggregate plant near Dallas, which will begin production in December. The plant, containing three kilns, will produce haydite, utilizing shale obtained from a recently acquired 125-acre pit nearby.

The bulk of the haydite will be used by The Texcrete Companies (another affiliate of Texas Industries), which operates a large-scale lightweight concrete block plant near the new plant.

Wisconsin, Michigan Firms Join Darden F & A Licensees

Newest F & A licensees of Roy Darden Industries, Inc., Atlanta, Ga., are the Economy Block Company of Wauwatosa, Wis., and Louis Foster's Lumber and Builders Supply Company, Port Huron, Mich. The former will cover Wisconsin as its exclusive territory, and the latter the counties surrounding Port Huron.

According to Mr. Darden, the firm now has 19 licensees in 24 states. There is still territory available in the New England states, however, and in most of the states west of the Mississippi River.

Gerrit Lokker, 56, died recently at Holland, Mich. He was superintendent of the Dunn Manufacturing Co., where he had been employed for over 30 years.

10-Ft. Concrete Walls Take on Outsize Load To Prove Design Data

On September 19 at Marquette University, Milwaukee, Wis., two 10-ft. high cantilever-type retaining walls of 12-in. reinforced concrete masonry underwent an interesting testing program.

The tests, planned by R. E. Copeland, director of engineering for the National Concrete Masonry Association, were conducted for the Association by Professor O. Neil Olson, Marquette University. Subjected to a horizontal force of more than two and a half times the normal earth pressure for retaining walls 10 ft. high, the test walls demonstrated their ability to withstand this force. The application of a greater load was prevented by failure of the reinforced concrete footing.

Witnessing the tests, in addition to Professor Olson, were Mr. Copeland and Paul Bronson, Best Block Company, Milwaukee, chairman of the N.C.M.A. Technical Problems Committee. These tests were a part of a limited study to confirm the validity of design data on reinforced concrete masonry retaining walls prepared by the Association for early release to its members.

Coming Events

January 14 and 15 1953—Milwaukee. 33rd annual convention, Wisconsin Concrete Products Association. Plankinton Hotel.

January 25-29, 1953 — Cleveland. 33rd annual convention and exhibit, National Concrete Masonry Association, Public Auditorium.

February 1-4, 1953 — Chicago. Annual convention and show, Mason Contractors' Association of America, Inc. Sherman Hotel.

February 9 and 10, 1953—Toronto, Canada. Fourth annual convention, National Concrete Products Association (Canada). King Edward Hotel.

February 17-19, 1953 — Boston. Annual convention, American Concrete Institute. Statler Hotel.

February 23-26, 1953—San Francisco. 23rd annual convention, National Ready Mixed Concrete Association. Hotel Fairmont.

February 25, 1953 — Dallas. Fourth annual convention and meeting, American Concrete Pressure Pipe Association. Baker Hotel.

February 26, 1953—Dallas. Third annual convention and meeting, American Concrete Agricultural Pipe Association. Baker Hotel.

February 26-28, 1953 — Dallas. 45th annual convention and meeting, American Concrete Pipe Association. Baker Hotel.

Fischer Lime & Cement Company Winner in N.R.M.C.A Safety Race

Vincent P. Ahearn, executive secretary of the National Ready Mixed Concrete Association, reports that the analysis of the results of the 1952 N.R.M.C.A. safety contest has been completed. The winning company in Class A (companies producing more than 100,000 cubic yards of concrete during the contest period from July 1, 1951, to June 30, 1952) is the Fischer Lime & Cement Company, Memphis, Tenn., which operated without a single injury to employees or non-employees and with only two property damage accidents during the contest period.

Seven companies entered in Class B competition (companies producing from 50,000 to 100,000 cubic yards of concrete during the contest period) had accident-free records. Following the policy previously established by the safety committee, the company with the greatest combined total of yards of concrete produced and man-hours worked receives the higher rating in the case of identical scores. Therefore, the Morse Sand & Gravel Co., Inc., Attleboro, Mass., is awarded the Class B trophy.

In recognition of their accident-free records, a Certificate of Achievement in Safety will be awarded to each of the following six companies entered in Class B competition:

Concrete Supply Co., Inc., Evansville, Ind.
Radcliff Gravel Co., Inc., Mobile, Ala.
Consumers Supply Co., Louisville, Ky.
Acme Ready Mix Concrete Co., Rockford, Ill.
Longview Concrete Pipe Co., Longview, Wash.
Michigan Foundation Co., Inc., Trenton, Mich.

Additional recognition should be given to Acme Ready Mix Concrete Company, which has had an accident-free record for two consecutive years.

Forty-eight companies entered in Class C competition (companies producing less than 50,000 cubic yards of concrete during the contest period) had accident-free records. Thomas, Bennett & Hunter, Inc., Westminster, Md., with the greatest combined total of yards of concrete produced and man-hours worked among these accident-free companies, will be awarded the Class C trophy.

Certificates of Achievement in Safety will be awarded to the following companies:

F. M. Reeves & Sons, Inc., Roswell, N. M.
**Rock River Ready Mix, Dixon, Ill.
**Blake Brothers Co., Richmond, Calif.
C. W. Blakeslee & Sons, Inc., New Haven, Conn.
F. D. Lewis & Son, Inc., Greensboro, N. C.
*Samuel Braen & Co., Mahwah, N. J.
**The Union Sand & Supply Corp., Painesville, Ohio
Frank Moritz and Sons Co., Mansfield, Ohio
*Modahl and Scott, Inc., Bloomington, Ill.
Land Construction Co., St. Joseph, Mo.
*Mesaba Construction Co., Hibbing, Minn.
*Tyler Ready-Mix Concrete Co., Tyler, Tex.
The City Coal & Supply Co., Meadville, Pa.
*Certified Red-D-Mix Concrete, Lawton, Okla.
Findorff Lumber & Supply Co., Madison, Wis.
Island Dock, Inc., Kingston, N. Y.
Builders Supplies Co., Goldsboro, N. C.
Thorn Lumber Co., Martinsburg, W. Va.
*Pocahontas, Inc., Salisbury, Md.
Ready-to-Pour Concrete Co., Idaho Falls, Idaho
Brewer's City Coal Dock, Inc., Holland, Mich.
Richard Scully, Inc., Coatesville, Pa.
Verona Redi-Mix Co., Verona, Wis.
Evans Brothers Co., Newark, Ohio
***The Trumbower Co., Inc., Nazareth, Pa.
**Shamokin Ready Mixed Concrete Co., Inc., Shamokin, Pa.
*Coon Certified Concrete, Luzerne, Pa.
**Mooney Bros. Supply Co., New Castle, Pa.
Concrete Materials, Inc., Morristown, Tenn.
*Ready Mixed Concrete Co., Annandale, N. J.
Randecker Brothers, Lock Haven, Pa.
Shawnee Ready Mix Concrete & Asphalt Co., Inc., Plymouth, Pa.
*Helena Sand and Gravel Co., Helena, Mont.
**Gethmann Concrete & Materials Co., Gladbrook, Iowa
*Maysville Ready-Mix Concrete Co., Maysville, Ky.
Cairo Construction Corp., Cairo, N. Y.
Glynn Construction Co., Brunswick, Ga.
Certified Materials, Inc., Goshen, Ind.
*Wiltgen Ready Mix Co., LeMars, Iowa
Mathews Ready Mix, Gridley, Calif.
Waverly Ready-Mix Co., Waverly, Iowa
**Monroe Ready-Mix & Material Co., Monroe, Wis.
Alvin Building Materials, Inc., Alvin, Tex.
**American Aggregates Corp., Ready Mix Div., Greenville, Ohio
Mankato Ready Mixed Concrete Co., Mankato, Minn.
**Watertown Cement Products Co., Watertown, S. D.
Macy Brothers, Inc., Lynnville, Iowa

*Accident-free record for two consecutive years.
**Accident-free record for three consecutive years.
***Accident-free record for five consecutive years.

The PIT AND QUARRY trophies will be presented to the three winning companies at the convention in San Francisco next February. Certificates of Achievement in Safety will be mailed by the Association to accident-free companies which did not win a trophy. All production and distribution employees of the three winning companies will be awarded Certificates of Accomplishment in Safety by the Association.

This year 182 companies submitted reports, as compared with 157 companies last year. These 182 companies produced 16,131,368 cubic yards of concrete during the 12-month period ended June 30, 1952.

"Unless this industry shows awareness of the importance of good public relations and makes a maximum effort to reduce and then to eliminate accidents, we shall surely suffer through regulations which will make operations expensive or even impossible," warns Mr. Ahearn. "Every member company should participate in our safety contest. We expect greater participation next year. You can co-operate by submitting an enrollment form which will be sent to you next March and then by submitting a report on the form which will be sent to you next July, covering the period from July 1, 1952, to June 30, 1953."

Color Tone of Concrete Block Improved by Sandblasting

MacIsaac and Menke Company, general contractors of Los Angeles, Calif., have recently developed a practical, inexpensive method of improving the texture and color tone of concrete block. The method, which involves sand blasting, was used during the recent construction of one of the buildings at the Maywood plant of Consolidated-Western Steel Company, division of U. S. Steel.

The block used in the exterior wall was composed of a volcanic aggregate with a slight reddish cast grayed down by its cement binder. A light sandblasting of the completed wall resulted in exposing the red aggregate, besides giving the wall a new depth of color tone and a richness of texture that won complete approval. Joints in the wall were not disturbed by the treatment. Following sandblasting, waterproofing was applied in the form of a transparent repellent.

Nebraska Plant's Capacity To Increase with New Units

Expansion of production at the Platte Valley Cement Tile Manufacturing Company, Scottsbluff, Nebr., has been accomplished by the addition of a Columbia Model No. 8 automatic block machine, a pallet return, and a cleaner and oiler.

Proprietors George and Wallace Lillie expect to push the capacity of their block department to 4,000 units per day with their new equipment.

Mortarless Interlocking Block Tile of Louisiana, Inc., has filed articles with the office of the secretary of state, changing its name to "Z", INC., it was announced on November 4, 1952.

Kennedy and Whitney Named for A.C.I. Posts By Nominating Committee

The 1952 nominating committee of the American Concrete Institute, consisting of Harmer E. Davis (chairman), H. J. Gilkey, Frank H. Jackson, Carl A. Menzel, Douglas E. Parsons, Myron A. Swayze, H. F. Thomson, and Kenneth B. Woods, has reported the following nominations for election at the 49th annual convention of the Institute in Boston, February 17-19, 1953: for president Henry L. Kennedy, to succeed A. T. Goldbeck for a one-year term; for vice-president, Charles S. Whitney, for a two-year term.

Mr. Kennedy is manager of the Cement Division, Dewey and Almy Chemical Company, Cambridge, Mass. He has been associated with the Institute since 1934 and is a member of several committees. Since 1944 he has been a member of the board of direction. As a consulting engineer he has specialized in reinforced concrete design and construction in the United States, Canada, Germany and England.

Mr. Whitney, consulting engineer with Ammann and Whitney, New York, N. Y., and Milwaukee, Wis., has been an A.C.I. member since 1920, and has served on many committees of the Institute. He has won high honors in the field of reinforced concrete design.

C. H. Scholer, head, department of applied mechanics, Kansas State College, Manhattan, Kans., elected for a two-year term as vice-president at the 1952 convention in Cincinnati, continues in that office.

For directors the following have been nominated: Federico Barona de la O, Arthur P. Clark, Jay E. Jellick, and Vernon P. Jensen—all for three-year terms.

Mr. Barona heads the technical department of materials of the Hydraulics Ministry, Mexico City, and has been an A.C.I. member since 1947. Mr. Clark, a research associate with the American Iron and Steel Institute, National Bureau of Standards in Washington, D. C., has been affiliated with the Institute since 1924 and with the Bureau of Standards since 1944. As manager of the Portland Cement Information Bureau, San Francisco, Mr. Jellick serves as advisor to Army engineers and Navy public works officers on the uses of concrete. He has been active in A.C.I. for nearly 30 years. Dr. Jensen is staff consultant for C. F. Braun and Company, Alhambra, Calif. An Institute member since 1931, he has served on several important committees.

Maule Industries Announces New Officers and Directors

Directors of Maule Industries, one of the largest producers of concrete building products in Florida and a major supplier of building materials in the Greater Miami area, recently announced the election of the following officers and directors: J. Bradley Streit, chairman; J. H. Buchanan, president; M. F. Pafford, executive vice-president and treasurer; F. K. Foster and F. Paul Anderson, vice-presidents; A. W. Wallace, secretary; J. Lee Telford, assistant secretary; Don Kelly, assistant treasurer; R. C. Faber, assistant vice-president; E. B. Streit, general superintendent; S. C. Allen, chief engineer; and F. C. Bamman, manager precast concrete department.

Control of Maule Industries, an enterprise founded many years ago by E. P. Maule and carried on by members of his family after his death, changed hands about six months ago with the purchase of a controlling block of its shares by Chemical Research Corp. of Delaware.

While C. B. McDonald is retiring as president of Maule Industries, he will remain as a director. The directors also voted a dividend of 7½ cents per share on the common stock payable December 20 to stockholders of record December 10, 1952.

● This exhibit of Anchor Concrete Products, Inc., won first prize at a recent Buffalo Better Homes Show. The exhibit demonstrated various uses and patterns to which the concrete units lend themselves. Note the excellent use of patio blocks and also the attractive concrete masonry wall in the background.

Marietta Concrete Corp. to Make Precast Panels at Baltimore

Announcement of a $100,000 expansion of existing facilities at their Baltimore, Md., plant to provide for the production of Marietta precast concrete wall panels was made recently by Frank L. Christy, president of the Marietta Concrete Corporation, Marietta, Ohio.

Plans call for the completion of the project shortly after the first of the new year, according to C. B. Ross, vice-president in charge of Marietta's Baltimore plant. When in operation, the new plant is expected to have a capacity to produce 2,000 sq. ft. of finished wall panels a day. It will enable the Marietta Concrete Corporation to make available to architects, contractors, and builders in the eastern part of the country the modern Marietta precast concrete wall panels that were developed for quick, low-cost curtain-wall construction.

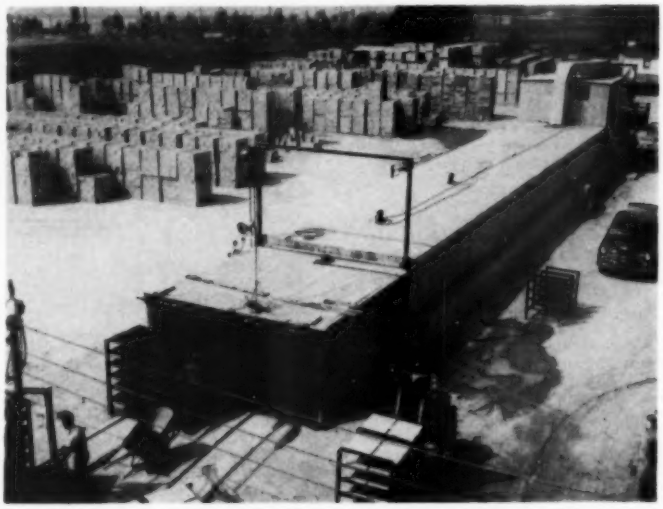
Marietta precast concrete wall panels made their initial appearance in the industrial field more than a year ago. At that time the Marietta firm supplied over 600,000 sq. ft. of finished wall panels for the multi-million dollar plant of the Electro-Metallurgical Division of the Union Carbide & Carbon Corporation at Marietta. The panels are usually 8 ft. by 10 ft. by 5 in. in size, and consist of two layers of high-strength concrete separated by rigid insulation. They are cast with metal inserts and are bolted directly to the building framework. By using Marietta precast concrete panels, a crew of nine men can erect 3,500 sq. ft. of finished wall a day, at a cost of approximately $2.25 to $2.50 per sq. ft.

The firm recently was awarded a $500,000 contract to supply precast concrete wall panels for an aircraft factory being constructed by the Grumman Aircraft Corporation at River Neck, Long Island, N. Y. This contract is being filled by Marietta in association with Precast Building Sections, Inc., New York City, who will produce the panels in their New York plant with engineering and production features supplied by The Marietta Concrete Corporation.

The expansion of its Baltimore plant to include wall panel production facilities is a part of an intensive program currently being undertaken by The Marietta Concrete Corporation to broaden the scope of its panel operations. The plant is ideally located for this type of production, being in the heart of an area enjoying a large construction boom. Currently the Baltimore plant, under the direction of C. B. Ross, produces concrete staves for farm and industrial silo construction, and a complete line of precast and structural concrete products.

SOUTHERN CALIFORNIA BLOCK MAKERS VISIT OUTSTANDING PRODUCING PLANTS

By HARRY F. UTLEY



• The O'Kelley-Eccles continuous curing tunnel at Baldwin Park, Calif., seen from the preheating room at the feed end. The new block machine is at the left below, just out of the picture. Blocks move through automatically, being exposed to heat and moisture for about 8 hours. Fans and the main block-enclosed duct may be seen along the kiln at ground level.

another ON THE SPOT removal

DEPARTING from their usual dinner meeting, members of the Concrete Masonry Manufacturers Association, Los Angeles, went on tour the afternoon and evening of October 29, visiting a number of interesting block plants in the San Gabriel Valley area east of Los Angeles.

The tour began with assembly at the Superior Concrete Block & Building Supply Company in Temple City, where car pools were organized to accommodate more than 60 association members and guests, the caravan covering stops and inspections of facilities at the O'Kelley-Eccles Company, Baldwin Park; the Azusa Concrete Block Company, Azusa; and the Pacific Concrete Products Corporation and the Roy S. Beal plants in El Monte.

During the tour the participants were welcomed by Chamber of Commerce and municipal officials of the various communities visited, and the entire group stopped for dinner at the Coconino Club in El Monte.

Continuous, Automatic Curing Kiln Of the plants visited, the high point of interest appeared to be in the operations of the O'Kelley-Eccles Co., where an automatic continuous curing tunnel is the principal feature. From a small start six years ago in Montebello, Calif., and another operation a little later in Monrovia, this concern has grown to become one of southern California's leading producers. The Montebello and Monrovia plants have since been discontinued, the two properties now being utilized only as sales and distribution yards.

All production is now concentrated at the Baldwin Park plant. Conventional masonry units, both standard and lightweight (pumice) are manufactured on the latest 1952 model Besser Vibrapac, while mortarless interlocking units are made on an automatic machine built to company specifications by GoCorp.

The O'Kelley-Eccles continuous curing tunnel is 14 ft. wide and 130 ft. long, with no waste overheard clearance. It was built of concrete-masonry and has an insulated concrete roof, accommodating two rows of racked blocks. The steel racks, mounted on flanged wheels, move through the 130-ft. steam kiln in a matter of 8 hours over a system of double tracks. The Vibrapac is convenient to the feed end; and a turntable facilitates placing of the rackloads of green blocks on the tracks, to be pushed into the short preheat section of the tunnel, but separated from it by an automatic open-and-close door.

• Racked blocks are removed automatically at the yard end after curing in the O'Kelley-Eccles continuous kiln. The door raises and lowers automatically, too, as the hydraulic rams, one of which may be seen between the rails in the foreground, pull out two racks every 12 minutes. The steam ducts and control room may be seen above the tunnel roof.

The preheating room accommodates six rack-loads and utilizes exhaust steam from the curing tunnel proper, raising the temperature of the freshly-molded blocks about 10 degrees before they enter the main (curing) part of the tunnel. Tight-fitting metal doors at both ends are electrically operated, and the loads of block are moved along the parallel tracks by hydraulic rams, those at the yard end being fitted with ratchets to pull a pair of loaded racks out at the end of the curing cycle. Doors are raised and lowered, the racks moved along, and a pair pulled out at the tunnel end every 12 minutes by the clock, all accomplished automatically by a system of centralized controls housed topside the kiln. Heat and moisture are unit-generated, and the steam is circulated by fans and a system of ducts, arranged to create a "hot zone" about two-thirds of the way along in the tunnel. This arrangement allows the blocks to be brought up to maximum heat and moisture conditions gradually; and it likewise serves to reduce these curing factors as the loads of blocks approach the end of the steam cycle within the tunnel. The plant operates on a 24-hour basis about 10 months of the year. Several fork-lifts are used to store and load the cubed units in the yard.

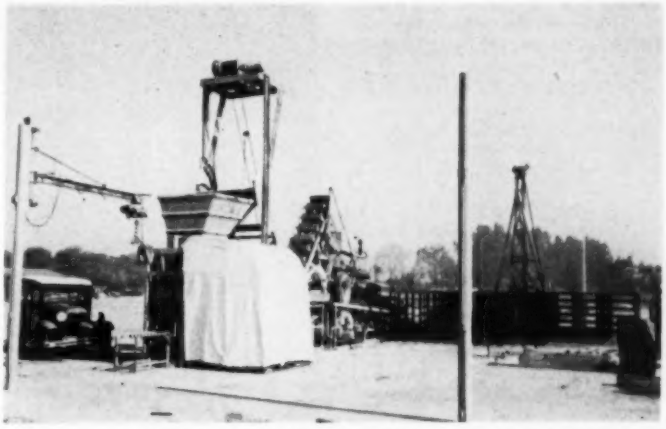
Cube-handling by fork-lifts is, however, carried a step further by O'Kelley-Eccles. It is standard practice to hook up a special 4-wheel model fork-lift to the flat-bed delivery trucks, trailing it along to the point of delivery. There it is unhooked, the engine started, and the blocks quickly unloaded in cubes just as they are loaded in the yard. The arrangement is especially useful on drop-shipments.

Newest Automatic Plant Visited

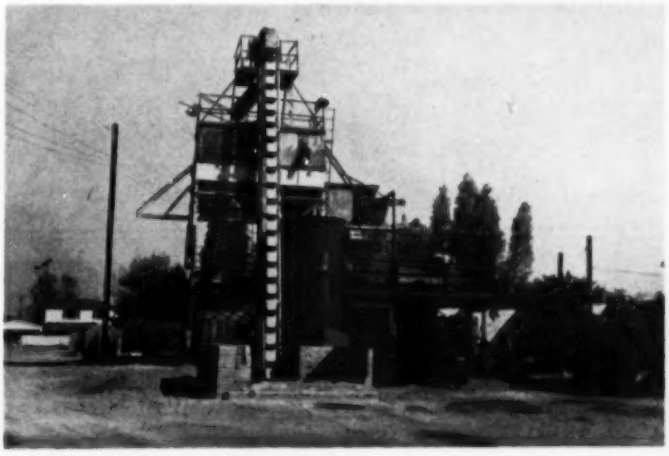
Although the plant of the Pacific Concrete Products Company is still under construction, with full operation scheduled for some time after the first of the year, the touring blockmakers were visibly impressed by the facilities being installed on a 17-acre site by this firm. The installation, said to be the first of its kind on the West Coast, was supplied by the Multiplex Machinery Corporation of Elmore, Ohio. This includes the skip-hoist, 50-cu. ft. mixer, and a Multico Blockmaster No. 3 fully-automatic, hydraulically-powered machine. Foundations have been poured

(*Continued on page* 166)

• One of the O'Kelley-Eccles delivery trucks trailing a fork-lift, used to unload the cubed blocks at the point of delivery.



• Equipment being placed for the new plant of the Pacific Concrete Products Corporation in El Monte, Calif. The canvas enclosure houses automatic controls for the block machine. Just behind, on the ramp, with loader-buckets visible, is the mobile weigh-batcher.



• The Roy S. Beal plant in El Monte was designed and built in its entirety by Mr. Beal, even including the two automatic block machines.

Indiana Products Plant's Story Records Continuing Development

another ON THE SPOT report

THE Cook Block & Brick Company of Anderson, Ind., is only six years old, but in that short period it has really lived. Nothing about this operation apparently is really static as one expansion and improvement program after another is undertaken to make it one of the most interesting and efficient concrete block plants. We had delayed visiting this plant, waiting for a lull in this activity but finally decided that progress was continuous. As a result, this article will tell of improvements completed, under way, and contemplated.

By WALTER E. TRAUFFER

The history of this company reflects the personality of its owner, Virgil Cook. After achieving some success in other fields, Mr. Cook in 1939 joined his father in the block business in Newcastle, Ind., 20 miles southeast of Anderson. In 1941, however, he sold out his interest in this business and went into the heating and air conditioning business; but in 1945 he again went back with his father. In 1946 he sold out his interests in both businesses and started up his present plant at Anderson. Since then he has stayed in one place and with one business, but what he has done to it is the story we have to tell.

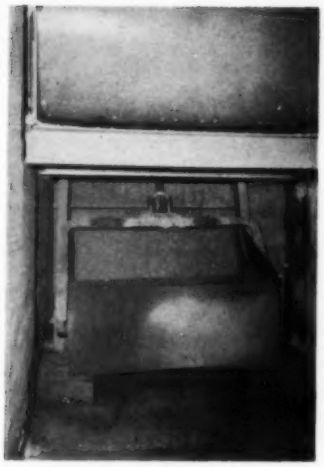
A general view of the Cook Block and Brick Company's plant at Anderson, Ind., showing the car unloader in the foreground.

When this plant started, there were 13 small concrete block plants in Anderson; now there are only three, but their combined output is far greater than that of the original 13. In 1951 the Cook plant produced five times as many blocks as in 1947, its first full year of operation. Anderson is not a block-minded city, although it is gradually coming around, and the 90 percent of available business Cook is getting takes only about one-half the output of the plant. The balance of the output is sold within a 50-mile radius, with some shipments going as far as 100 miles.

Mr. Cook firmly believes that quality is the best salesman and that a little extra cement to insure quality costs less than a salesman. The fact that high quality has been maintained at all times is given most

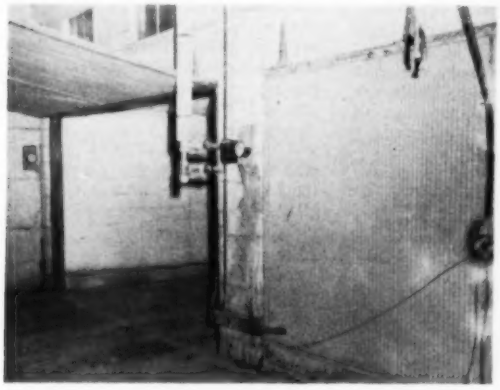
The car shaker unloading lightweight aggregate. The jib-crane moves the shaker into and out of position.

The batcher over the 50-cu. ft. concrete mixer.

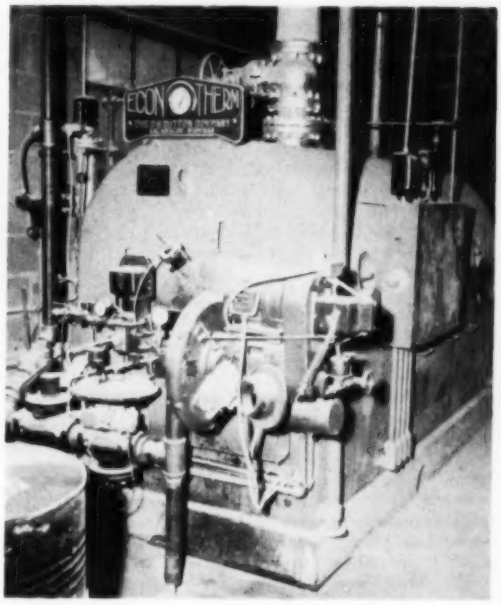


The skip bucket which feeds concrete from the mixer to the block machine.

The block machine makes 6,000 standard units per shift by means of a special spring and built-in cam arrangement.



Above: The curing rooms are equipped with insulated doors and automatic heat controls. Thermocouples send the kiln temperature up to 170 deg. F. and then shut it off.



Right: The 96-hp. oil-fired boiler which supplies live steam for curing. The furnace has 356 sq. ft. of heating surface.

of the credit for his success in this business. The major items necessary to produce a good block are, he says, a good, heavy machine, a graded aggregate, accurate proportioning, ample cement in the mix, good curing, cubing, and getting the block on the job in the best possible condition.

The mix used in this plant results in a block which tests 1,800 p.s.i. gross area and 3,600 lb. net at 28 days, with a yield of 22 blocks per sack. Many more blocks per sack could be obtained and strengths still kept well over the state specification of 900 p.s.i. gross area, but Mr. Cook prefers to keep the quality up. He charges 2 cents per block more than the competition and still can't keep up with the demand.

The Celocrete lightweight aggregate used in this plant is received in hopper cars. The system of unloading and storage was built a year ago. A National car shaker attaches to the car and insures quick and complete unloading. A jib crane handles the shaker into and out of position. Under the track hopper a pan feeder supplies a belt conveyor, which in turn feeds the Celocrete via a chain bucket elevator to a 150-cu. yd., C. S. Johnson bin with three aggregate compartments and a 400-bbl. cement compartment.

A storage area for Celocrete is now being built and this will have a capacity of 2,500 tons. A Hough Payloader will rehandle from the stockpile to the hopper. This will make it possible to build up enough storage in the winter to overcome the summer shortage of aggregate.

One of the more serious problems encountered was the difficulty of getting well-graded sand and gravel,

This water softener conditions well water for use in the mix.

and two years ago Mr. Cook decided to produce his own. The deposit has excellent gradation and a desirable color and this has resulted in a better and more attractive block. The gradation is so good that only a little No. 12 gravel (⅜- to ⅛-in.) needs to be added to make it suitable for use. A new 1-cu. yd. General dragline dips the material out of the pit to a pile and an Insley ½-cu. yd. dragline feeds it over gravity screens into bins. Two sizes are made: minus ½-in. and ½- to ⅜-in. During the coming winter a 2-man-operated, 2-unit portable plant will be installed; and then it will be unnecessary to buy any No. 12 gravel. This plant will have a capacity of 100 t.p.h.

A 5,000-ton storage for sand and gravel will also be built at the block plant to carry it over the wet weather in early spring when weight limits on secondary roads do not permit heavy hauling. A White cab-over-engine tractor with a 15-cu. yd. dump trailer is used for hauling to outdoor plant storage or via the track hopper to the conveying system to plant bins.

No admixtures are used, but the fines in the sand and gravel are such that they impart unusually good waterproof qualities to the blocks. They also limit the amount of cement that can be used without making the concrete too gummy for best production. This aggregate is credited also with making the finished blocks nearly white, and giving them a smooth texture—features which have been a great sales help. As the plant is outside the city limits, the company has its own well and an Elgin water conditioner makes it ideal for this purpose. A 10,000-gal. cistern was recently installed for fire protection.

Cement is received in bulk cars and is fed *via* screw conveyor and elevator to the 400-bbl. cement compartment of the bin. When this compartment is full, the cement is diverted from the elevator into a 1,200-bbl. outside silo which discharges back into the above screw conveyor, forming a closed circuit.

The Besser Super Vibrapac block machine used in this plant was installed when the plant was built and does not have a few of the features found on later models, such as the magnetic pallet return. A special spring and built-up cam arrangement gives this machine a capacity of 6,000 standard 8- by 8- by 16-in. blocks, or equivalents, per 8-hour day. The top of the 50-cu. ft. Besser mixer is at floor level, and the skip bucket is in a pit on the same level with the aggregate conveyor for accessibility. The mixer receives concrete ingredients from a C. S. Johnson weigh batcher.

A platform lift truck, designed and built in the shop, hauls the loaded racks from the machine to the six curing rooms or kilns which have a capacity for one day's output. These kilns are in one row, open at the plant end only, and are fitted with Universal insulated doors. They have double Celocrete block walls and roofs, the latter with 8-in. pumice blocks and built-up roofing for further insulation.

Live steam is supplied to the kilns from a Dutton 96-hp. Econotherm gas- or oil-fired furnace with 356 sq. ft. of heating surface. Individual thermocouples at the center of each kiln allow the heat to reach 170 deg. F. and then shut it off. Because of the excellent insulation the kiln temperature drops only 20 deg. F. in 20 hours in the coldest weather, giving the blocks a good soaking in the process. Roof ventilators and fans are used to draw out the steam when the doors are opened.

The blocks are taken from the curing rooms by three Clark fork-lift trucks to the paved storage area, which has a capacity of about 250,000 blocks. Cubes of 60 are made and these are usually stacked four cubes high. When pressed for space, however, the men can store the lightweight blocks five cubes high. All types and sizes of blocks with large enough holes 6-, 8- and 12-in. and specials—can be handled direct in cubes, but the 4-in. blocks and bricks are handled on wooden pallets.

A masonry saw is used for making special sizes of units.

Most of the blocks are delivered in company-owned trucks with special bodies designed and built in the company's shop. Most of the trucks are Chevrolet cab-over-engine chassis with straight delivery bodies having a low center of gravity. There are also two semi-trailers of low-slung design with White c.o.e. tractors. The 15-cu. yd. dump trailer which brings sand and gravel from the pit was also made in the shop.

Mr. Cook was among the first in the industry to realize that the concrete block manufacturer is in an ideal position to sell the many other items required in the construction of a house or small business building. Actually, he says, there is more profit in selling the windows and doors for a house than there is in the blocks. This end of the business has reached such proportions that he recently built a 22- by 177-ft. warehouse for such items Ceco steel and aluminum windows; Aetna steel door frames; Harris area wells and foundation grills; Majestic Heatolaters and outdoor fireplaces; Standard dry-wall and Sonneborn waterproofing products; and reinforcing rods, cement, mortars, etc.

At Lawrenceburg, Ind., the Miller Block and Supply Company has recently added a second Model No. 8 Columbia block machine and a second Columbia block splitter to its facilities. Both units were manufactured by the Columbia Machine Works, Vancouver, Wash.

Daniel Urban, who has served The Kent Machine Company, Cuyahoga Falls, Ohio, as sales engineer, has been promoted to sales manager of the Concrete Products Machinery Division.

Reinforced Masonry Buildings Show High Earthquake Resistance

ACCORDING to an article published in the August issue of the *Bulletin*, official publication of the Southern California Chapter, American Institute of Architects, the recent California earthquakes did relatively minor damage to buildings constructed of reinforced concrete block masonry. Effects of the disastrous earthquakes in the Tehachapi-Arvin-Bakersfield area were carefully studied by several architects and civil engineers, and the following major conclusions were reached:

1. Among all structures of all types of construction which showed little or no earthquake damage, reinforced concrete block masonry buildings were conspicuous.

2. Such masonry construction used far less reinforcing steel than that currently required by many existing codes.

3. Interconnection of walls and other structural parts proved to be of much greater importance than mere quantity of reinforcing steel.

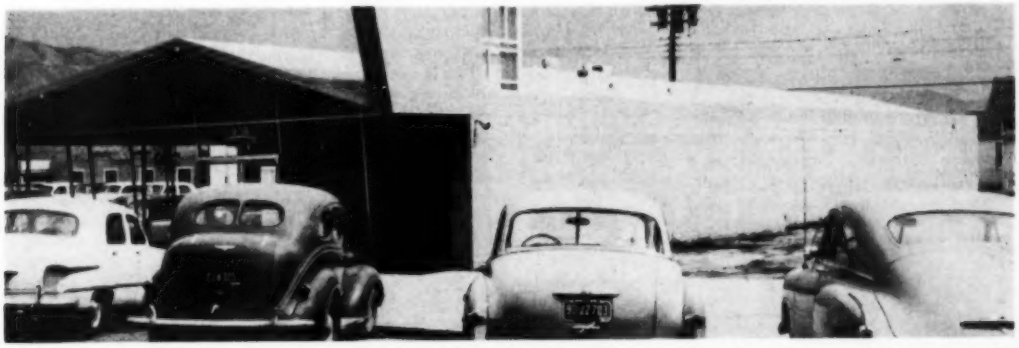
It was pointed out as a significant fact that after the tremors, one of the undamaged concrete block buildings became the headquarters office used in directing the relief for those suffering from less sound construction.

On the basis of the above-mentioned observations, certain rules were pointed out that should make concrete masonry construction even less susceptible to earthquake damage in the future.

A major principle advocated is the use of vertical steel reinforcing rods at sides of windows and doors and at all corners and wall intersections; these rods should extend from the concrete foundation to the top of the wall. Horizontal steel bars should be used in foundations and above and below windows and doors and at tops of walls and roof levels. All reinforcing steel should be en-

(*Continued on page* 166)

• A corner of the fire station at Tehachapi, Calif., hows earthquake damage. It is believed that the cracks were due to limited use of vertical steel reinforcing rods in the wall and the fact that few of the cells were grouted. Note that no vertical rod was used to meet the dowel in the lower right corner.



• Above: Undamaged reinforced concrete block building in Arvin. Note the absence of cracks in the glass front and the masonry wall.

• Below: The Post Office building in Arvin, constructed of reinforced concrete block, remained intact after the earthquake, while the adjoining structure "lost face."

Precast, Prestressed Concrete Members for Highway Bridges

By WILLIAM M. AVERY

• A general view of the prestressed bridge member plant operated by Concrete Products Company of America at Pottstown, Pa. Prestressing beds are at the left, while the batching and mixing facilities are housed in the building at the rear.

another ON THE SPOT report

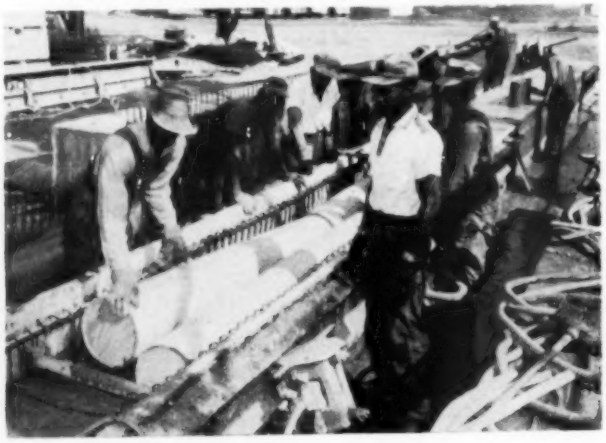
WITH the successful development of a practical and economic method for the production of prestressed concrete bridge members, Concrete Products Company of America has written an important chapter in the history of a construction technique which is still relatively new to engineers in this country. Utilizing precast members produced under rigid control at plants located in Pottstown and Pittsburgh, Pa., the company has fulfilled contracts with the Pennsylvania Department of Highways for more than 50 bridges having clear spans ranging from 12 to 50 ft. The prestressed members are delivered to the site ready for speedy erection on existing abutments, and the cost in place is said to run about 25 percent less than for comparable reinforced concrete structures of conventional design.

We recently visited the plant at Pottstown, and were profoundly impressed with the speed and all-around efficiency of the company's production methods. The members are cast on long pretensioning beds which have cable anchorages at either end capable of withstanding a total load of 200 tons, the 120-ft. spacing between anchorages making it possible to cast two or more members simultaneously on each bed. Except for the heavily reinforced concrete slabs on which the stressing beds rest, the entire system is portable in that it can readily be disassembled and moved to another location for site casting operations.

For the members which have been manufactured to date, prestress has been applied with ¼-in. diameter seven-strand steel cables furnished by American Steel & Wire, but cables of 5/16-in. diameter and larger can be handled with equal facility on the stressing beds. The bridge members are manufactured in three depths: 17 in. for spans up to 28 ft.; 21 in. for spans meas-

• A conventional bucket, handled with a bridge crane, delivers concrete to the molds. Note the sleeves crimped onto cables which project from the anchorage in the foreground.

• Placing paper tubes which are used to create voids and thus reduce dead weight of beams. The tubes are wired down to prevent them from floating when the remainder of the concrete is poured.



New manufacturing technique used for many spans in Pennsylvania

uring from 30 to 36 ft.; and 33 in. for clear spans from 38 to 50 ft. All the members manufactured at present are 36 in. wide.

Each bed provides for pretensioning any even number of cables up to a maximum of 80; *i.e.*, 40 cables on ¾-in. centers in each of two horizontal rows, each vertical pair of cables consisting of a single length looped around a steel rod which comprises the fixed anchorage. Since the pretensioning is actually measured by the elongation of the cables, the first step of the process is to place exactly 400 lb. of pull on all the cables in order to have a uniform starting point. Micropress sleeves are then placed on the free ends of the cables with a crimping tool and the elongation is accomplished with screw jacks. The cables are tensioned in groups of ten, the jacking devices being driven by a motor and gear reducer to speed up the process. When a total elongation of 7¼ in. is achieved, steel plates of exactly this length are inserted into the screw jaw assemblies to carry the load. This elongation is equivalent to a tensile stress of 135,000 p.s.i., compared with an ultimate strength of about 256,000 p.s.i.

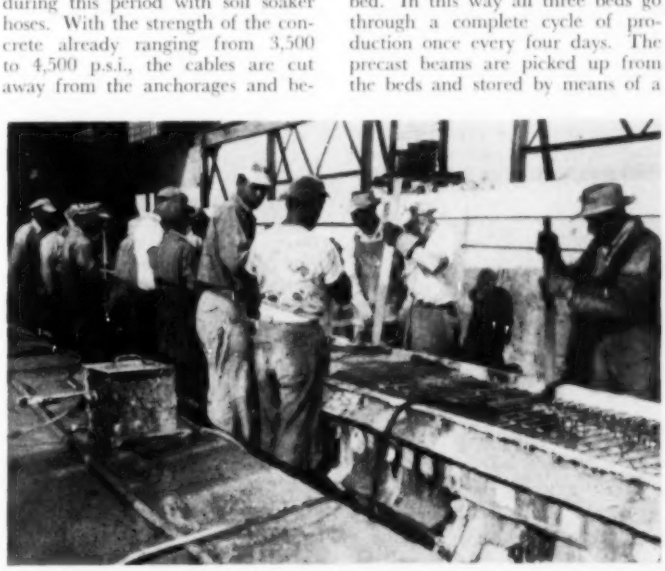
When the prestressing is completed, side forms are bolted to the beds, bulkheads are placed in accordance with the number and length of individual spans to be made on each bed, and stirrups are placed in accordance with the design requirements. In the first stage of pouring only enough low-slump concrete is placed in the bed to cover the cables. Paper Sonotubes are then dropped in the bed and firmly anchored in position by steel wires. The tubes, which are sealed at the ends, create voids in the finished members which very materially reduce dead load. Three different sizes, 10, 12½, and 24¾ in. in diameter, are used for members 17, 21 and 33 in. deep respectively. Wire mesh and steel rods are placed over the tubes to take care of any tension that may develop due to prestressing, and then pouring is completed and the molds are thoroughly vibrated.

Immediately after the concrete has been placed and vibrated, it is vacuum processed to assure the attainment of high-early-strength, great density, and maximum bond between the concrete and the steel cables. The steel side forms, end walls, and top pads used in this process are of special construction to permit the removal of excess water from the concrete. So that a vacuum can be established between the concrete and the sides of the molds, the inside surfaces are lined with copper screen which is in turn covered with a material called Halco cloth, a strong fabric which lasts for 65 or 70 cycles of use. Air and water are exhausted through pipe fittings welded at regular intervals in the steel plates, rigid manifolds and flexible hoses being used to expedite the job of connecting the system to a Fuller VC-200 rotary vacuum pump. A single set of side forms and top pads serves for casting members of all depths on all three stressing beds.

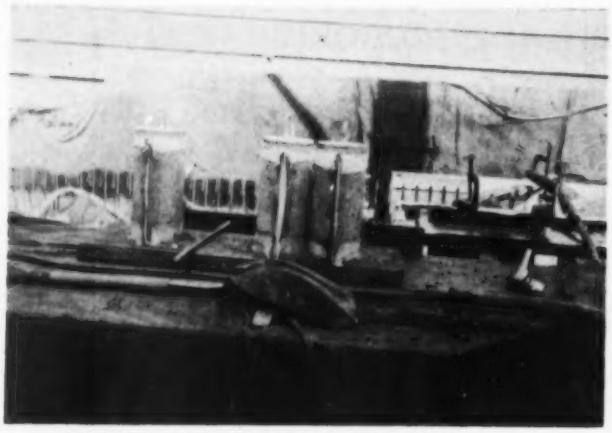
After approximately 30 minutes of processing in this manner with 15 to 24 in. of vacuum, the forms are stripped and covered with burlap. The removal of the excess water makes the concrete strong enough to walk on immediately after the forms are stripped. The beams remain on the stressing beds for three days after they are poured, the burlap covering being kept wet during this period with soil soaker hoses. With the strength of the concrete already ranging from 3,500 to 4,500 p.s.i., the cables are cut away from the anchorages and between adjacent members on the bed with an acetylene torch, effecting an immediate transfer of the load to the concrete. Camber, amounting to as much as ¾ in. for a 50 ft. member, enters the units as soon as the cables are cut.

Since all stress is transmitted in bond between the concrete and the steel cables, there is no chance of either an abrupt or a gradual loss of the prestress. Even when members have been tested to failure there has been no evidence of slippage between the steel and the concrete. When a member tested at Pottstown finally broke under a concentrated load of 75,000 lb. at the center (about three times the design load), definite camber was found in each of the halves, proving beyond question that the bond was not broken even under this extreme condition.

The facilities at Pottstown consist of three identical stressing beds located side by side and served by a single overhead bridge crane. The beds are operated insofar as possible on an assembly-line basis, in that while concrete is being poured on one bed, preparations, including prestressing of cables and setting of steel, are in progress on the adjacent bed. In this way all three beds go through a complete cycle of production once every four days. The precast beams are picked up from the beds and stored by means of a



• Concrete is thoroughly rodded and vibrated to prevent voids and assure maximum bond with the steel cables. One of the vibrators may be seen in the lower right-hand corner of this view.



• A feature of the rigid quality control is the making of test cylinders for each series of beam produced. Special molds permit the use of vacuum processing on cylinders as well as on bridge members themselves.

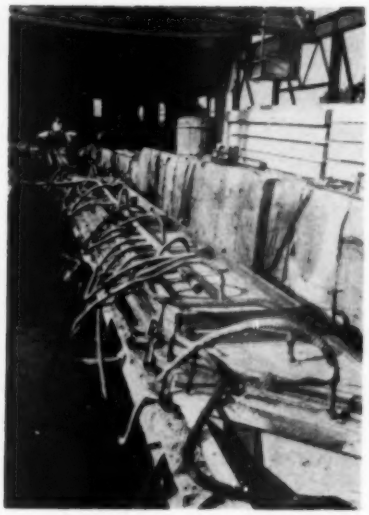
steel strongback and cables which engage threaded inserts cast into the ends of the units.

Concrete used in the process must gain strength rapidly in order that the cables may be cut and the stressing beds re-used as quickly as possible. The vacuum processing is said to be a major factor in meeting this requirement, but actually every conceivable precaution is observed to assure that only the strongest concrete is used. Performance is rigidly controlled by making test cylinders along with each member as it is manufactured; these are vacuum cured and stored under the same conditions as the prestressed beams in order to obtain the closest possible correlation between test findings and the units themselves. Concrete in the test cylinders shows compressive strengths of around 5,000 p.s.i. at 10 days, and of 6,000 to 8,500 p.s.i. at 28 days.

The materials used consist of regular air-entraining portland cement, commercial trap rock with a maximum size of ½ in., and natural sand. These ingredients are carefully weighed to obtain the desired proportions and then thoroughly mixed in a 30-cu. ft. Besser batch mixer. The moisture content of the sand fraction is carefully determined and checked against the amount of water added at the mixer and the amount recovered in the vacuum processing system to assure a net addition of no more than 4 gal. per sack of cement. Concrete is dumped from the mixer into a conventional bottom-discharge bucket which is handled by means of the bridge crane. The crane suspends the bucket above the stressing beds, moving slowly from end to end of the molds as they are filled.

The members are delivered to the point of use by either rail or truck, with truck transportation predominating by a wide margin. Transportation appears to limit the clear spans which can be handled to about 50 ft., although the beds themselves could accommodate members up to about 120 ft. long. Although a number of members measuring 53½ ft. in overall length have been produced for clear spans of 50 ft., most of the projects which have been served to date involve relatively short spans. This is evidenced by the fact that on occasion as many as eight individual members are cast simultaneously on a single bed. Lengths of square-end members are determined by the positioning of standard bulkhead, while skews of any degree are readily provided for by the use of special bulkheads.

• B. J. Paskin, chief engineer of Concrete Products Company of America and Arch A. Owen, project engineer, Pennsylvania Department of Highways.



• A portion of one of the stressing beds, with hoses used in vacuuming processing attached to side molds and top pads. The molds and top pads can be stripped after 30 minutes of vacuum treatment, which removes excess water laitance and any surface air pockets which might exist.

The prestressed members show a number of impressive advantages over comparable cast-in-place construction. For given spans and loading they require approximately one-fourth as much reinforcing steel and about 60 percent as much concrete. Where a 50-ft. monolithic span may require 48 in. of solid concrete, the hollow prestressed member for the same load will be only about 33 in. deep.

Another important advantage is that the precast members may be used without the application of special surfacing material, since the concrete produced by the vacuum process is said to have about 50 percent more abrasive resistance than ordinary concrete cured in the conventional way. Curbs may be provided for by setting special reinforcing steel in the basic members and pouring the additional concrete after the cables have been cut and the units removed from the stressing beds.

Field erection is rapid and highly efficient, the work consisting of placing the required members side by side on abutments, tying them together laterally by passing steel rods

→

Photos on the page at the right, taken by M. W. Loring, consulting engineer for Concrete Products Company of America, show various steps in the erection of a 5-span bridge at Gleniron, Union County, Pa. Work was done by the Murphy Construction Co. of Hummelstown, Pa.

Unloading the members from railroad cars with the 40-ton crawler crane.

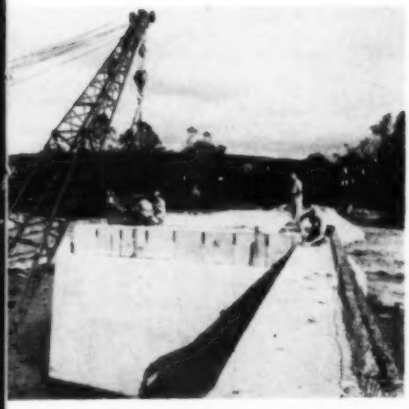
One of the members loaded on trailer trucks for ¼-mile haul to the bridge site. Camber is plainly visible.

Loaded trailer trucks were spotted at at bridge site with a tractor.

Closeup of the steel strongback, or lifting beam, used for handling and placing the bridge members on abutements.

A curb-section being placed on span No. 1. Members are 35 in. deep and weigh about 20 tons each.

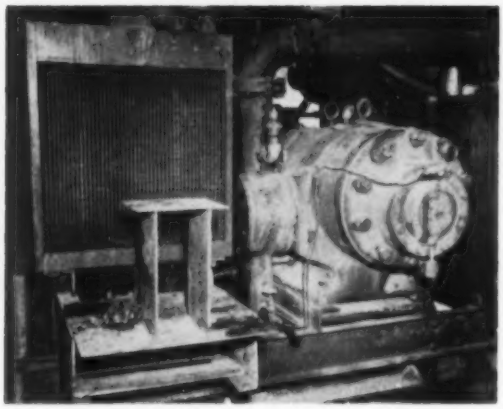
View of the downstream face of the bridge as the last of the 5 spans was being erected in the background.



View from one of the piers showing the steel embedded in exterior members for later casting of curbs. Note keyway slots in ends of members in far span.

Members being tied together with 1-in. diameter steel rods. Paper tubes were used to form holes in members at time of casting, great care being exercised to so locate them that holes will mate when the units are erected. Tubes were removed at the construction site.

One of the spans replaced by the prestressed structure was this covered bowstring truss bridge had been in continuous service since 1844. Contrast between this photograph and the one immediately above it epitomizes abrupt departure of prestress design from older concepts.



• Left: The vacuum is pulled with this rotary vacuum pump.

• Right: Prestressed cables are cut with an acetylene torch after the concrete has wet-cured for three days. Camber enters the beams the instant the cables are cut away from the anchorage.

highway bridge at Glen Iron, Pa., consisting of five spans 27 ft. wide and 53 ft. 6 in. long over-all, was delivered and erected in six days by a seven-man crew, including a crane operator. Each member supplied for this project weighed about 20 tons.

Chiefly responsible for the development of the process here described are Robert Peterson, president, and B. J. Baskin, chief engineer of Concrete Products Company of America. Licenses to use the process have already been issued to several qualified concerns in the Middle West, and similar arrangements for manufacture in other localities are in negotiation.

through cored openings provided when the original precasting is done, and finally filling the keyways between adjacent members with thoroughly compacted dry-pack grout. Fairly short single-span, 9-member projects have been completely erected in as little as 27 minutes, and a

Block Makers Visit Plants

(*From page* 157)

alongside to accommodate a Blockmaster No. 2 machine to be installed early in 1953. The No. 3 machine is scheduled to produce only 8-in. high units, while the No. 2 Blockmaster will turn out the popular 4-in. high blocks favored for residential work and many exposed installations in southern California. Nathan D. Gorin, who heads the concern, is also West Coast representative for Multiplex, and the new facilities will serve as a demonstration plant for prospective purchasers of similar equipment.

No bins are to be used to store the red volcanic cinders and other aggregates used at the Pacific plant. Nor will there be conventional permanently-located batching equipment. Instead, a Willard mobile weigh-batcher will load from stockpiles arranged radially in the yard and at the bulk-cement station. After batching, the unit will climb a steel ramp and discharge the dry batch into the Multi-Mixer. Instead of being powered by an internal-combustion engine, the Willard batch is driven by electric motors, overhead cables transmitting the power. The cables are strung from a short mast on top of the batching rig to a high, steel "antenna" tower. Since it is planned to operate the batcher over a radius of 110 ft. from the base of the tower, the cable will be held taut and the surplus pulled underground by a 400-lb. lead weight. The weight and the surplus cable will descend vertically down a 10-in. diameter 125-ft. deep well casing which is now being drilled alongside the tower. The same shaft will also be used to provide the plant with water.

Mr. Gorin began producing concrete-masonry units at another location in El Monte about three years ago. His old plant has been abandoned in favor of the new operation just described. It is understood that the old equipment, although somewhat out-moded, will be shipped to Baja California, where it will again become operative.

The Roy S. Beal plant in El Monte was the final stop for the group, and it was dark by the time the caravan arrived. Mr. Beal had strung up plenty of lights for the occasion, however, and he demonstrated his equipment which is noted through the El Monte area because everything from the two completely automatic machines to the power lift-trucks was designed and built by Mr. Beal himself.

In addition to conventional masonry units, the Beal plant turns out "Wave Block" for garden walls. When laid up, the resulting wall structure is serpentine in form and is said to possess great structural strength without reinforcement, in accordance with an ancient principle of masonry construction.

Marvin Olson, credit manager of the Salina Concrete Products Company, Salina, Kans., was recently elected president of the Kansas Retail Credit Association.

Reinforced Masonry Buildings

(*From page* 161)

cased in cement grout. In addition, there should be a definite connection of floor and roof framing to concrete masonry walls.

The report also emphasized three important specifications to be met by manufacturers of hollow concrete masonry units: (1) the masonry units should have a minimum compressive strength of 1,000 p.s.i. on gross area at the time of construction; (2) the units should be at least 28 days old before being used in construction; and (3) the units should have a maximum lineal shrinkage from the saturated condition to the oven-dry condition of less than .08 percent.

The promotion of L. F. Reimann to assistant vice president of manufacturing at Jackson and Church Co., Saginaw, Mich., has been announced. He has been superintendent of plants in the Saginaw area.

Thor Germundsson was recently named manager of the Structural and Railways Bureau of the Portland Cement Association, Chicago, Ill. Mr. Germundsson has been with P.C.A. since 1930, having previously served with several engineering organizations as a designer of steel and concrete structures.

Transfer of the industrial truck sales and service departments of Hyster Company's Eastern Division to Danville from Peoria, Ill., has been announced.

High-Quality Standards Win Business For Oakland Block Makers

By HARRY F. UTLEY

• The plant, the curing room, and the yard of Acme Concrete Products in Oakland, Calif.

another ON THE SPOT report

QUALITY of product, consistently maintained, has been the keynote to success of Acme Concrete Products, Oakland, Calif., which in the space of seven years since the plant was established in 1945 has become an important factor in the concrete units industry in the San Francisco Bay area.

There are, of course, other block manufacturers in Oakland with greater production capacity, but Acme's owners—Otto Vix, Paul Thompson, and Lyle Sampson—profess to no delusions with respect to aims toward increased output. Theirs is a medium-sized operation turning out about 3,200 8-in. high units per 8-hr. day, and they expect to remain in that category. But Acme's product has earned such a reputation for quality that demand is always greater than supply. Should any of the output fail to meet the rigid standards set up by the company for strength, permeability, or uniformity of color and texture, that product is sold as substandard and that purchaser knows definitely what he is buying.

Production comes from a 400-unit-per-hr. (8- by 8- by 16 in. or equivalent), fully-automatic machine designed and built in its entirety by Mr. Sampson, including the off-bearing hoist. Output is standardized on a modified pumice-aggregate unit employing about 80 percent pumice and 20 percent natural sand in the mix. Building-code requirements in the bay area for load-bearing units call for 1,000 p.s.i. but no Acme block is sold as first quality unless it possesses a minimum of 1,250 p.s.i.

Curing is done in two concrete-masonry steam rooms, each 10 ft. wide, 7 ft. high and 44 ft. long. A third room is to be built in the near future as present curing capacity is somewhat under daily production capacity.

Steam is produced economically and flexibly by a Malsbury gas-fired generator consisting of dual 15 h.p. units, the combined rating of 30 h.p. being ample to take care of the ultimate requirements after the third kiln comes into service. The Malsbury generator is controlled by room thermostats which start and stop the unit as required without attenion. After a curing room is filled and closed, the generator brings the temperature up to 180 deg. from a cold start in about 3 hrs. and holds it in the 180-185 deg. range for about 7 hrs., after which it shuts off as the blocks cool down gradually before removal. A Hyster 40 fork-lift truck handles the racks and loads the cubed units in the yard.

Aggregates are stored by bucket

• Production comes from this company-built 400-unit per-hour automatic vibrator machine.

• A partial view of the curing rooms, each 10 by 7 by 44 ft. A third room is to be added at the right.

• This steam generator, requiring little or no attention, keeps steam temperature in the kiln in the 180-185 degree range during the 7-hour curing period. A concrete-masonry enclosure was just being started when the picture was taken.

• A rack being filled with the small concrete plugs described in the article. The hand stripper which molds them, 100 at a time, is in the background.

elevator in a 3-compartment 100-ton steel bin which supplies the weigh-batcher. An L. & W. 14-cu. ft. mixer prepares the concrete. An important factor in the consistent high quality of the production at the Acme plant is due, the management reports, to the regular use in the mix of a synthetic detergent additive, D40. This product, chemically, is a sodium-alkyl-argyl-sulphonate produced by the Oronite Chemical Company, a Standard Oil Company of California subsidiary. One to two ounces per bag of cement are added at the mixer for air entrainment and dispersing action. The resulting increased plasticity improves handling ability with less breakage, gives sharper corners and edges, at the same time improving the texture and color of the cured units. Compressive strength is also increased due to the necessary decrease in water content of at least 10 percent to offset the increased fluidity of the mix.

The Acme company is also the exclusive manufacturer of conical concrete plugs used to fill the small holes left in monolithic concrete walls after the spacing and retaining nuts are removed from the threaded form ties. Formerly these holes were thumb-packed laboriously by hand with stiff cement grout. By using the precast plugs, which are dipped in thin grout and rammed into the holes, the task is greatly simplified. The entire output it taken by W. J. Burke & Company, San Francisco, construction-equipment distributors who sell them throughout the West Coast. A Flam No. 3 hand-operated stripper with a separate mixer is used to cast the plugs at the Acme plant, where 100 are molded at a time on a regulation steel pallet. Like the masonry units, the plugs are also steam cured.

Three Companies to Construct Second San Diego Aqueduct

Construction of the second barrel of the San Diego Aqueduct, a $18,000,000 concrete pipe project, began in September, 1952.

The pipe line will parallel the existing aqueduct, completed in 1947, to more than double the capacity of the facilities which now carry Colorado River water from the main line of the Metropolitan Water District at San Jacinto, Calif., to San Diego, a distance of about 80 miles.

The successful bidder on the first portion, a 9-mile section from San Jacinto southward to Winchester, Calif., was the R. V. Lloyd Company on its bid of $2,574,800. The Lloyd firm has been the builder of several units of the vast lateral system to irrigate the Coachella Valley.

The second link, extending from Winchester to a point midway between Winchester and Temecula, will be built by Engineering Constructors of Los Angeles. Their bid was $2,065,021 for the 10 miles.

The third section, connecting the south end of Schedule 2 and the San Luis Rey River in San Diego County, will be built by Johnson-Western Constructors of San Pedro, Calif. Their bid on the 14.1-mile section was $3,192,826.

Contractors for the present work will not face the problems and difficulties experienced when the first aqueduct was built five years ago. Tunnels and syphons were constructed for the second aqueduct at the time the first line was built, in anticipation of the present enlargement program.

The new aqueduct will be built on right-of-way acquired when the first line was built. For the most part, it will lie west of the existing main and 25 to 75 ft. from it. The second barrel will be slightly larger than the first, the new line carrying 95 second-feet, as compared with 85 for the original aqueduct.

Congress appropriated $18,000,000 for the U. S. Navy to build the concrete-pipe facilities and the Navy, in turn, assigned the responsibility for design and construction to the Bureau of Reclamation. The engineer in charge is C. S. Hale, who for eight years supervised the building of the 123-mile Coachella Canal and the vast distribution system to irrigate 78,500 acres of the desert-like Coachella Valley.

The St. Charles Ready-Mix Company has purchased the ready-mix concrete plant located near St. Charles, Ill., from the E. A. Meyer Construction Company, Inc., North Chicago, Ill. Officers of the newly formed organization include Carl N. Norlander, president; H. R. Mass, vice-president; William F. Snellgrove, secretary; and William Mitchell Jr., treasurer.

R. G. Thomson, of Woodstock, Ont., Canada, has acquired a controlling interest in Schell Industries Limited, of Woodstock. He will be president and general manager, and Norman C. Schell will remain as chairman of the board of the company, which manufactures concrete blocks, bricks, and ready-mixed concrete.

• This excellent photograph gives an overall picture of the Rocklite Products operations near Ventura, Calif. The block storage yard and the block plant are at the left; the expanded-shale plant, and the deposit at the foot of the range at the right.

Rocklite Expanded Shale Plant Serves Los Angeles Area

another ON THE SPOT report

By HARRY F. UTLEY

OPENING of the new Statler Hotel in Los Angeles in August, 1952, marked the completion of a building project employing one of the largest volumes of lightweight aggregates ever used in the West.

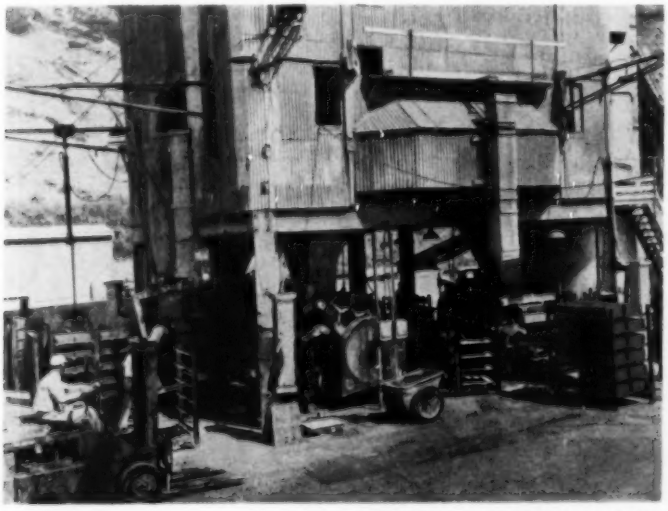
Approximately 50,000 cu. yd. of expanded-shale aggregate were produced and delivered on schedule to the job by Rocklite Products, of Ventura, Calif., located about 70 miles from the site of the project.

Concrete was batched and mixed on the job in a C. S. Johnson plant with 500-cu. yd. of aggregate storage in the bins. The restricted area at the site made ground storage impossible; so it became mandatory that the plant bins be kept full at all times. Six trucks operated on rigid, round-the-clock schedules between the Ventura plant and downtown Los Angeles. Throughout the 10 months of daily concreting, there was never a delay due to a shortage of aggregates, daily production and placing of concrete ranging between 200 and 300 cu. yd!

According to E. A. Peterson, manager of Rocklite operations at Ventura, the exclusive use of lightweight concrete above ground on the Statler project reduced dead load by at least 30 percent, permitting a 15 percent reduction in the weight of the structural-steel framing used.

The Rocklite shale-expanding plant is currently being enlarged by the addition of a fourth rotary kiln. The newest burning unit, 8 ft. in diameter and 125 ft. long, will increase capacity from a present 160,000 cu. yd. annually to 225,000 cu. yd. Flexibility of operation will, at the same time, be materially aided by the placing of a surge storage pile in the plant circuit.

The Rocklite shale occurs in a range of hills a couple of miles from



• Three high-capacity machines at the ground level beneath the bin-batching-mixing structure have a combined hourly capacity of 2,700 standard 8-in. units.

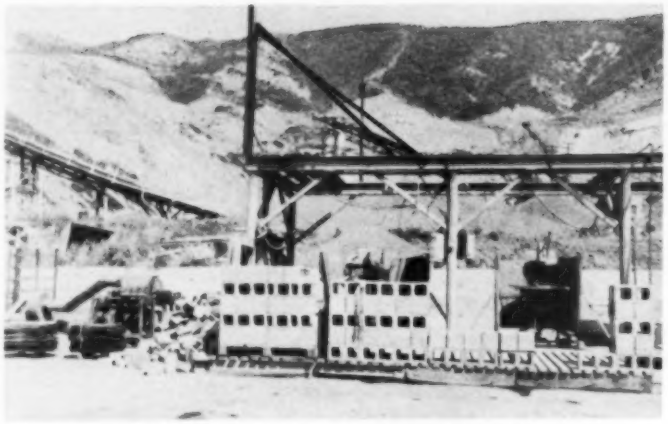
downtown Ventura. It is light blue in color and is readily ripped loose in the deposit and either, dozed by Caterpillar tractors directly into the plant receiving hopper, or transported to the hopper by Carryall scrapers. Crushing and preliminary sizing is done before the material is expanded in the kilns. This assures well-rounded particles with an impervious outer skin surrounding the vesicular interior. None of the material is crushed subsequent to expansion, so that these characteristics are retained, insuring durability and low absorption.

Finished screening, after the bloated Rocklite comes from the coolers following the kilns, separates the aggregate into four basic sizes, with average weights as follows: $\frac{3}{16}$ to 1 in., 38 lbs. per cu. ft.; $\frac{5}{16}$ to $\frac{3}{8}$ in., 45 lbs. per cu. ft.; No. 8 to $\frac{5}{16}$ in., 55 lbs. per cu. ft.; minus No. 8, 63 lbs. per cu. ft.

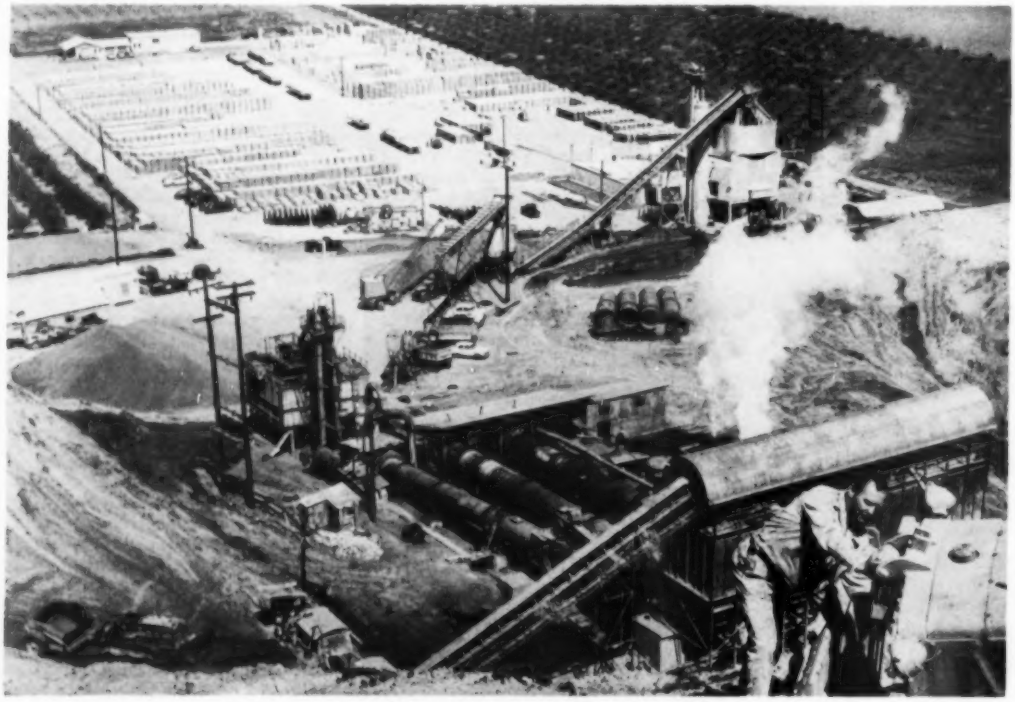
All shipments are made by truck, but the company is its own biggest customer, since its concrete-units plant adjoining the shale operation has a capacity of 2,700 standard blocks (8- by 8- by 16-in. or equivalent) per hour. Modern storage, batching and mixing facilities are located above the three Oswalt-serviced Besser Super Vibrapac machines. The third machine went into service just a few months ago. Two additional curing rooms are being provided, in addition to the 7 existing tunnels, to handle the accelerated output of blocks. Appurtenant equipment includes a Bergen pallet cleaner, a couple of Clipper masonry saws, and several industrial-type fork-lift trucks. There are nine acres of paved yard area.

Shipments are made within a 250-mi. radius of Ventura, the bulk of

(*Continued on page 174*)

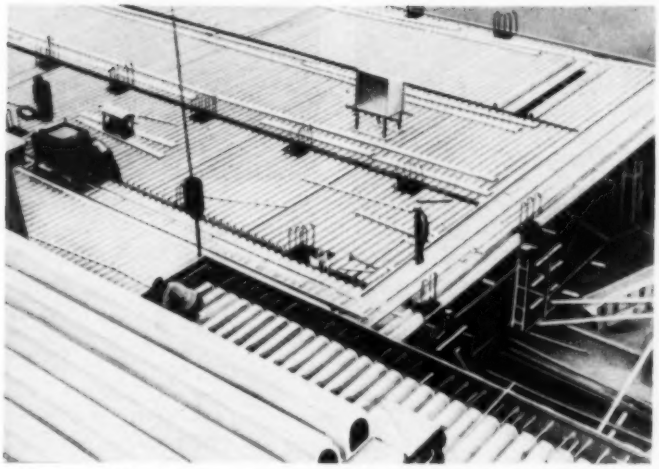


• In one corner of the block plant yard are the pallet cleaner (left) and two masonry saws. The air-powered finger-lift hoist above can handle blocks or pallets.



• This view of the Rocklite plants, taken from the hill-side deposit, shows the shale-expanding operation immediately below, with the block plant beyond at the right. The fourth kiln, now being installed, may be seen in four sections about half way between the two plants. The overhead conveyor between the plants is being dismantled preparatory to installing a surge pile system.

A Solution of the Hollow Concrete Floor Problem



• 34-ft. span Coloso beam construction at the rebuilding of the bombed-out Engineering University of Munich in southern Germany.

By GEORGE W. HOFFMANN

MAN'S oldest industry, building construction, did not benefit much from the accelerating march of industrial progress until about the beginning of this century, when hollow concrete blocks began to replace the porous and unsanitary common clay brick which had been used in construction for more than 3,000 years. As much as anything else, concrete block made possible the mass housing movement that has spread throughout the world. Adding impetus to this movement in recent years has been the development of light but strong building units to support roofs and floors, units that are insulating and are easy to make and to lay in place.

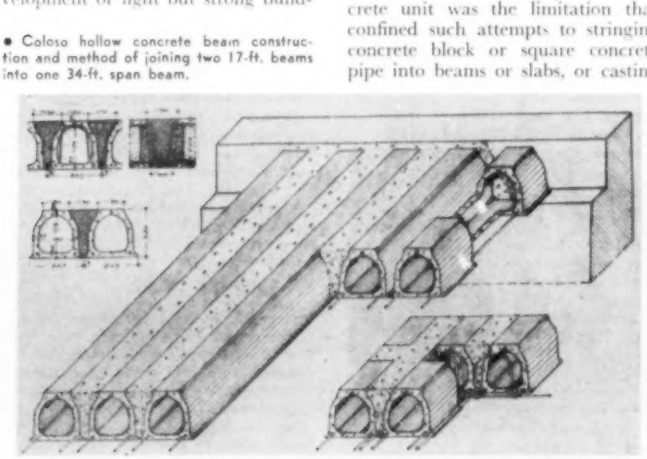
In the centuries which have passed since the Spanish Moors built the first known hollow ceilings with a baked clay unit called "Bovedilla", hundreds of types of hollow floor and ceiling units have come and gone.

The basic idea back of attempts to make a hollow concrete floor and roof unit has always been the same. However, the lack of mechanical means to compact a concrete unit was the limitation that confined such attempts to stringing concrete block or square concrete pipe into beams or slabs, or casting such units monolithically; but in most cases so much reinforcing steel and so much weight had to be packed into these hollow floors that they were heavy and costly.

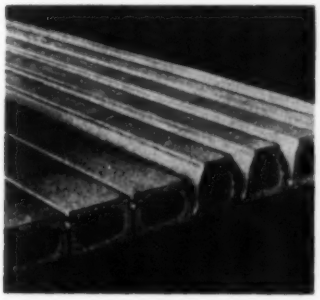
Today the builder has his choice of several types of building units which will carry loads and permit wide spans and which can be made of ordinary concrete. One such unit which has been widely used in the reconstruction of Germany, England, Belgium, Holland, and Italy, as well as for large mass housing projects and commercial buildings in Sweden and in South America and Mexico is the "Coloso" beam (trade mark registered). This thin-walled concrete beam or slab can span 34 ft. in a clear, smooth stretch and can be made and placed at a low cost. Indicative of the strength of these beams is the fact that a 12-ft. long reinforced "Coloso" beam made in Mexico of 40 percent lightweight pumice up to ¾ in. in size, and 60 percent quartz sand in a 1 to 4 mix supported loads of up to 1,300 lb. at its center before collapsing.

This beam is made in a new type of compacting mechanism with a simple mold which makes at one time two or three hollow beams each 17 ft. long and 10 in. wide of either 6- or 9-in height in 8 minutes flat. This is at the rate of 100 to 200 sq. yd. of finished floor in 8 hours. As in most other precast concrete problems in the manufac-

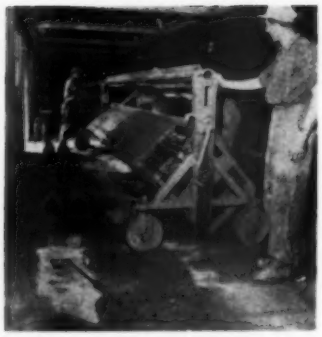
• Coloso hollow concrete beam construction and method of joining two 17-ft. beams into one 34-ft. span beam.



• Coloso beams of 6-in. and 9-in. height.



• Laying of a low-cost housing roof. A simple hoist delivers the beams to the roof height.



• Manufacturing method of 17-ft. long Coloso beams.

• A storage yard of Coloso beams at a German plant.

• Standard 10-in. steel channels will accommodate perfectly 9-in. Coloso hollow concrete floor beams.

ture of block, pipe, slabs, ornamental cast stone, etc., vibration is the solution. Powerful high-frequency vibration of regulated and controlled modulation which thoroughly compacts the concrete has made this method of manufacture possible. A 17-ft. "Colosso" beam requires about 7 cu. ft. of concrete, and the reinforcing can be adjusted to the aggregates and the local building codes.

N.C.M.A. Bulletin to Appear In Sweet's File for 1953

A four-page illustrated bulletin on the achitectural uses of concrete masonry published by the National Concrete Masonry Association will appear in the 1953 edition of Sweet's File, Architectural, and Sweet's File, Engineering.

The Architectural File is distributed to 17,000 active offices of architects, engineers and general contractors who are responsible for the design and construction of commercial, educational, religious, institutional, recreational, public, and miscellaneous residential and non-residential buildings.

Sweet's File, Engineering, will be distributed to 12,000 additional offices of consulting engineers, architects, contractors, industry and utility construction departments, as well as federal, state, county and municipal engineers. These offices are responsible for the design and construction of large industrial and commercial buildings such as warehouses, garages, hangars, factories, and shipyards.

Paul Klemens Named to Post On Columbia Machine Staff

Paul P. Klemens

Paul P. Klemens has been appointed assistant sales manager of Columbia Machine Works, Vancouver, Wash.

He has been vice-president and production manager at Smithwick Concrete Products company, Portland, Ore., since its establishment in 1946. Prior to that he was installation engineer for a block machine company in the Midwest.

Smithwick "Block Leader" Features Haydite Products

Volume I, No. 1 of *The Smithwick Block Leader* recently put in an appearance as the official news publication of Smithwick Concrete Products, Portland and Eugene, Ore.

It is the plan of the firm, according to President S. Carl Smithwick, to publish the 4-page bulletin monthly. Subject matter will be "news and views on haydite concrete and haydite masonry units."

Ruben Zadigan has been appointed district manager in the western New York and western Pennsylvania area by the Dicalite Division of Great Lakes Carbon Corporation, according to Joseph E. Moran, the Division's general sales manager. Mr. Zadigan will work at Dicalite headquarters in Buffalo.

Botched Batches

Grand Petty Larceny

IN Seattle the other day a man was convicted of petty larceny and sentenced to six months in jail for walking off with 250 concrete masonry units. Considering that 250

blocks would probably weigh around 10,000 pounds, we wonder just how much harder the guy would have to work in order to get promoted into the grand larceny category.

Bam! Boo!

IN a recent news letter the Commerce Department's office of Technical Services reports on the substitution of bamboo for steel in reinforced concrete. There is no indication at the moment as to whether this fascinatin' new material will be called "bamcrete" or "boocrete." If our readers have any opinion in regard to this vital matter, we herewith urge that they keep it to themselves.

Spokane Block Firm Begins Production of Colored Units

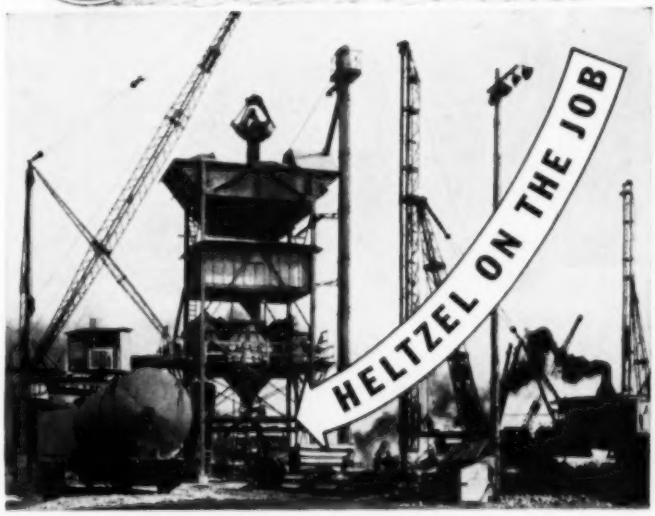
The Layrite Concrete Products Company, Spokane, Wash., has recently begun producing colored concrete masonry block, according to H. C. Lutes, president. Machinery costing $65,000 was installed for producing the new colored masonry units.

The colored block, called California stone, are produced in various shades of red, brown, and yellow. Some units are designed to simulate buff and brown sandstone. They can be used as veneer or trim, as well as for fireplaces.

The 1953 convention of the American Concrete Institute will be held from February 16 to 19 at the Statler Hotel in Boston. The first day will be devoted to meetings of the technical committees. Sessions on the 17th, 18th and 19th will be open to the public.

Heltzel BUILDS IT BETTER

HELTZEL HELPS
CONSTRUCTION DOLLARS
GO FURTHER



with
RAYMOND CONCRETE
PILE COMPANY
at
GREAT LAKES
STEEL
CORPORATION

PROBLEM: High capacity batch plant to simultaneously charge both a pumpcrete operation and a fleet of transit mix trucks.

ANSWER: Heltzel engineered batch plant that worked both pumpcrete and transit mix operations with practical perfection and helped Raymond Concrete Pile Company run ahead of schedule.

●The installation consists of a basic Heltzel 300-ton, 4-compartment plant (three 70-ton aggregate compartments; one 311-bbl. cement compartment); a 70' high, 250-bbl. per hour bulk cement elevator; a 1000-bbl. bulk cement recirculator with 33' 6" screw conveyor; a 2-cubic yard batcher to charge two tilt mixers—front end charging; special columns and braces to take care of height.

ASK FOR HELTZEL BULLETIN K-37 DESCRIBING PLANTS AND ENGINEERING SERVICE FOR CENTRAL MIX, TRANSIT MIX AND CONCRETE PRODUCTS OPERATIONS.

Heltzel BUILDS IT BETTER
The Heltzel Steel Form & Iron Company
Construction Equipment Since 1910
WARREN, OHIO
Flex-Plane

An Entirely **NEW** *Kind of Transit Mixer!*

IMPERIAL *HYDROCRETER*

A TRANSIT MIXER ENGINEERED, FLEET TESTED AND MANUFACTURED BY A FORMER CONCRETE PRODUCER

IMPERIAL *offers you:*

A few of the outstanding features

● MAXIMUM LEGAL PAY LOAD

- Exclusive Mixing Action
- Weight can be Shifted as Far Forward as Desired
- Shock-proof Power Transmission
- Simple Finger-Tip Controls in Cab and at Rear
- Highest Discharge and Longest Chute Available
- Hydraulically Operated Chute. No Lifting
- Precision, Long Life, Sealed Hydraulic System

Write or Wire for Latest Literature and Information on Demonstrations

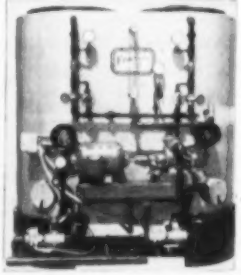
IMPERIAL CONSTRUCTION EQUIPMENT COMPANY

Division of Imperial Flooring and Waterproofing Company

3400 LAKE STREET MELROSE PARK, ILLINOIS

REDUCE Curing Costs . . . SPEED Curing Time
Do A BETTER Curing Job . . . with FRANCIS

STEAM GENERATORS



- Fully-automatic FRANCIS generators provide concrete-block plants with flexible, low-cost heat and humidity, so necessary for proper and rapid curing.
- Combined heat and moisture—or either semi-dry or saturated steam—may be generated as desired.
- Other features: no steam engineer required; steam up in 3 minutes from a cold start; twin units for standby protection; descaling system keeps coils clean. Costs half that of a conventional boiler.

● *Write for full particulars!*

Francis Steam Generator Co., Inc.

10202 E. Artesia Avenue, Bellflower, California

Expanded Shale Plant

(*From page* 170)

the output going into the Los Angeles area, where sales are handled exclusively by the Consolidated Rock Products Company through yards and distributing outlets.

Rocklite Products is closely affiliated, through interlocking ownership, with the Basalt Rock Company of Napa, in northern California. The concerns work closely together on research, planning, and execution. Each is the largest producer in its own right in its half of the state, and together they represent, perhaps, the dominant factor in point of capacity as well as aggressive management, in the nation's concrete-masonry industry.

E. F. Brovelli is president of Rocklite Products; M. M. McIntyre, vice-president; John R. Anderson, secretary-treasurer; and D. O. McCall, Chief engineer. E. A. Peterson is general manager of the combined operations at Ventura; W. A. Maxwell is aggregate-plant superintendent; and L. T. Frame is block-plant superintendent.

N.C.M.A. Publishes Report On Air Drying of Concrete Units

The National Concrete Masonry Association recently published a new technical report entitled *Rate of Moisture Loss from Steam Cured Concrete Masonry Units with Natural Air Drying, Under Cover.* The report gives the results of a study made by the Association with the cooperation of three N.C.M.A. member plants to determine the rate of moisture loss from 8-in. and 4-in. hollow units made with a variety of lightweight aggregates.

The report, based on elaborate experiments, includes graphs which show the drying time in days required to reduce the moisture content first to 40 percent of absorption and then to still lower limits. In addition, the report discusses the effect of such factors as weather conditions and methods of stockpiling on the rate of drying. It also includes a simple test procedure for roughly predicting the time required to dry units to a specified moisture content.

Office machines and $6,700 in cash were stolen recently from the office of the Ench Ready Mix Concrete Company at Paterson, N. J. In addition to the money taken from the company safe, three typrewriters, two air conditioning units, an electric adding machine, and other equipment were taken.

The A & E Readimix Concrete Company, Arcata, Calif., celebrated the third anniversary of its operation by opening a new ready-mixed concrete plant north of Arcata. The installation has a 200-cu. yd. aggregate bin, which is charged with four sizes of aggregates.

NOW! 2 NEW HYSTER® LIFT TRUCKS

Extra-Rugged for "INSIDE and OUTSIDE" Work

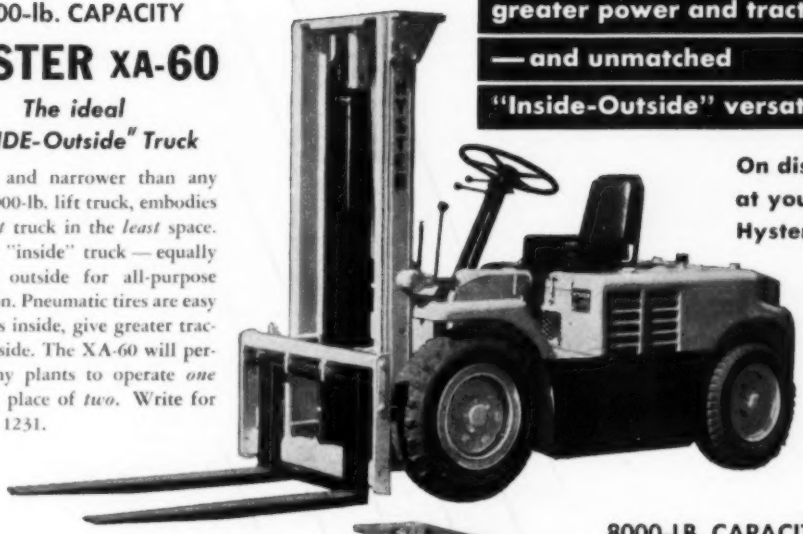
Shorter, Narrower, Faster—with greater power and traction —and unmatched "Inside-Outside" versatility!

6000-lb. CAPACITY

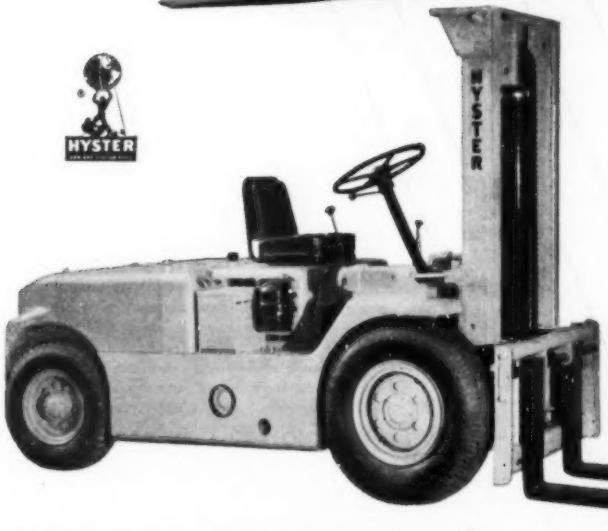
HYSTER XA-60

The ideal "INSIDE-Outside" Truck

Shorter and narrower than any other 6000-lb. lift truck, embodies the *most* truck in the *least* space. A great "inside" truck — equally efficient outside for all-purpose operation. Pneumatic tires are easy on floors inside, give greater traction outside. The XA-60 will permit many plants to operate *one* truck in place of *two*. Write for Bulletin 1231.



On display at your Hyster dealer



8000-LB. CAPACITY

HYSTER ZA-80

The ideal "OUTSIDE-Inside" Truck

Has long wheelbase, but SHORT OVER-ALL LENGTH — for smoother riding and high maneuverability. For use where most of work is *outside*, but truck is *also* required to work *inside* in close quarters. Extremely powerful, with tremendous traction, yet pneumatic tires assure maximum protection to floors. Write for Bulletin 1230.

HYSTER COMPANY

THREE FACTORIES

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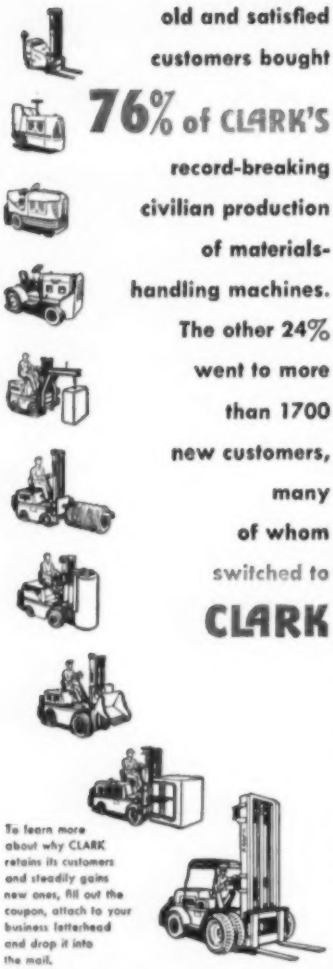
1826 North Adams.....Peoria 1, Illinois
1026 Myers Street.....Danville, Illinois

Be sure to get the whole Hyster "Inside-Outside" story before you buy *any* Lift Truck! Ask your Hyster Dealer, or write for Bulletins 1230 and 1231.

In 1951,
old and satisfied
customers bought
76% of CLARK'S
record-breaking
civilian production
of materials-
handling machines.
The other 24%
went to more
than 1700
new customers,
many
of whom
switched to
CLARK



To learn more about why CLARK retains its customers and steadily gains new ones, fill out the coupon, attach to your business letterhead and drop it into the mail.

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ELECTRIC AND GAS POWERED
FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

CLARK EQUIPMENT COMPANY • Battle Creek 90, Mich
Please send: ☐ Material Handling News ☐ Movie Digest ☐ Basic Facts ☐ Please have representative call.
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City _____ Zone _____ State _____

N.C.M.A. Bulletin Published For Distribution to Architects

Concrete Masonry, published by the Producers' Council, is a four-page bulletin prepared by the National Concrete Masonry Association for distribution to architects. It is an insert which appeared in the recent Technical Bulletin 62, describing the application of concrete masonry to the industrial type of building.

Data on the fire-retardant qualities of concrete masonry, a table presenting average and minimum face shell web thicknesses for various types of units and aggregates, and descriptions of wall patterns are given; and typical hollow concrete masonry units are sketched and explained. The American Institute of Architects assisted in assembling and editing the material.

Belgian Industrialists Study U. S. Plants on 6-Week Tour

A group of Belgians, composed of six representatives from management, technical operations, and labor in the Belgian concrete products industries, recently completed a six-week study of American production methods. The group made an extensive tour of the United States, which was arranged by the Mutual Security Agency in Washington.

Among the various concrete products plants visited were the facilities of the following: Basalt Rock Company in Napa and Ventura, Calif.; Rocklite Products Company, Ventura; and Otto Buehner & Company, Salt Lake City.

The Belgian visitors were very much impressed with the American mass-production machinery and large-scale methods of handling materials. They pointed out that an average Belgian plant requires some 400 man-hours to produce 100 tons of concrete masonry, as compared to 80 man-hours for the same production in a similar plant in the U. S. The higher production cost makes the selling price about 20 percent higher in Belgium.

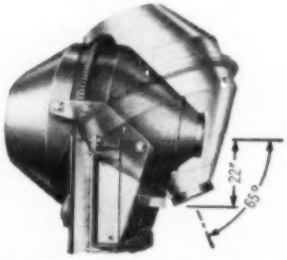
At the conclusion of their tour the visitors will prepare a report of their study and will recommend measures for increasing the productivity of their own industries.

The Western Conference on Prestressed Concrete was held November 14 and 15 at the Ambassador Hotel in Los Angeles. The conference, which made available the latest developments in the design of prestressed concrete structures to engineers, was sponsored by the California Institute of Technology, the University of Southern California, the University of California at Berkeley and Los Angeles, and the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme. Co-operating groups included the Portland Cement Association and various civil engineering societies.

Rife R. Saunders of Alexandria, La., has been elected to the board of directors of the Texas Industries Inc., Dallas. The firm operates four lightweight aggregate plants, including three in Texas and one in Alexandria.

Burmeister
"TILT-UP" MIXER
CUTS PLANT HEIGHT AS MUCH AS 8 FEET

Burmeister's patented "tilt-up" feature—which reduces the mixer's headroom requirement—permits lower plant heights. This means easier crane loading, lower power costs, lower initial costs, less costly "conversions," increased portability, and better over-all control.



• In addition to reducing plant height, Burmeister's 3 cu. yd. "Tilt-Up" Mixer (left) provides a steeper 65° discharge from one spot, eliminates segregation of concrete and the danger of accidental discharge. It is simple to install, and has an integral hydraulic system—no compressor is required. Write for name of your nearest Burmeister Distributor, without obligation.

SEND FOR FREE CATALOG
Your copy of Burmeister's new illustrated Catalog is now available. Write today!

COMPLETE PLANTS FROM A SINGLE SOURCE
Burmeister

L. BURMEISTER CO., 4535 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

NEW MACHINERY and SUPPLIES

● Hand Protectors

A line of hand protectors consisting of gloves, mittens, and palm guards is being manufactured by the Surety Rubber Company, Carrollton, Ohio.

The gloves are made of synthetic rubber and are closed with flexible metal zippers. They are said to have positive

gripping qualities, long wear, and great pliability. The various styles of hand protectors give safety protection against impact, cutting and abrasion.

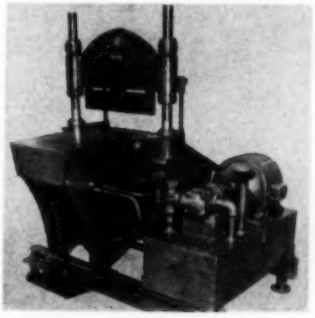
● Electric Fork Truck

An electric-powered fork truck with a capacity of 2500 lb. is being manufactured by the Baker-Raulang Company, Cleveland 2, Ohio as the model "FS-25".

The truck has a speed of seven m.p.h. and incorporates a "gyroscopic" trailing axle assembly that keeps the chassis level under all floor conditions. The truck has a motor that is built to handle extreme overloads, and is equipped with dynamic braking to prevent burning out by sudden reversals of direction. The dynamic brake stops the motor before reversal of direction can be made. The motor drives the power axle through a worm gear which provides low speed and high-torque. The lifting height of the model is 130 inches.

● Block Splitter

The Columbia Machine Works, Vancouver, Wash., has announced a block splitter for concrete masonry. The machine has a hydraulically operated guillotine head and a spring loaded table. It

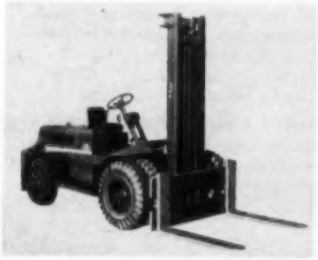


will handle masonry up to 8 by 24 in. with ease. There are four cutting blades on the machines. The splitter can be moved by a lift truck or wheels may be mounted on it.

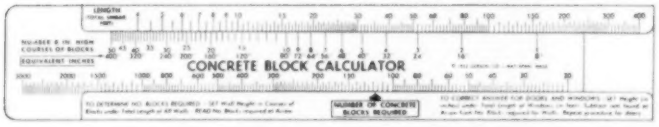
● Heavy-Duty Fork Truck

The new "Yardlift-100" is the latest addition to the Clark line of fork-lift trucks. This gas-powered, pneumatic-tired truck has a 10,000-pound capacity at 24-in. load center and is designed for handling building blocks, concrete and clay pipes, brick and tile, and other materials involved in outdoor storage operations.

The Yardlift-100 is powered by a Continental engine producing 55 brake horsepower at 2000 r.p.m. and a traveling speed of 17.8 m.p.h. It is compact



and maneuverable with a 133-in. turning radius. Hydraulic steering is standard, and with the "no-kick-back" axle, provides maximum operating ease. In case of motor stoppage, steering can be accomplished manually. Pneumatic tires increase riding comfort and tractive effort.



A calculator that shows the number of blocks needed for a wall or structure has been originated by the Louis M. Gerson Company, 98 Deering Road, Mattapan 26, Mass. It operates like a slide rule and is designed to have advertising material printed on the back.

BAUGHMAN

HI-SPEED JOB-FITTED Portable and Stationary

CONVEYORS

Move MORE materials at LESS cost!

Years ahead in design and construction.

Built better to last longer!

PROMPT DELIVERY.

Write for Catalog A-339.

BAUGHMAN MFG. CO., INC.

1012 Shipman Rd. Jerseyville, Illinois

Model 230

Jones COMPRESSION TESTING MACHINE

for more economical mixes, and uniformly higher strength

By doing your own testing of concrete blocks and cylinders, you will immediately discover anything which may have gone wrong with the aggregate, grading, mixing, etc. This will help you maintain more uniform quality and develop more economical mixes. The Jones (formerly Yoder) testing machine is low in first cost, specially designed for concrete products plants.

Send for list of satisfied users and literature.

J. A. Jones CONCRETE MACHINERY

108 Horning Road, Pittsburgh 34, Pennsylvania

Here's a new concept in light-weight

Engineered weight

designed to give you

PRECISION BUILT, two-compartment water tank assures accurate water measurement—even when mixer is not level.

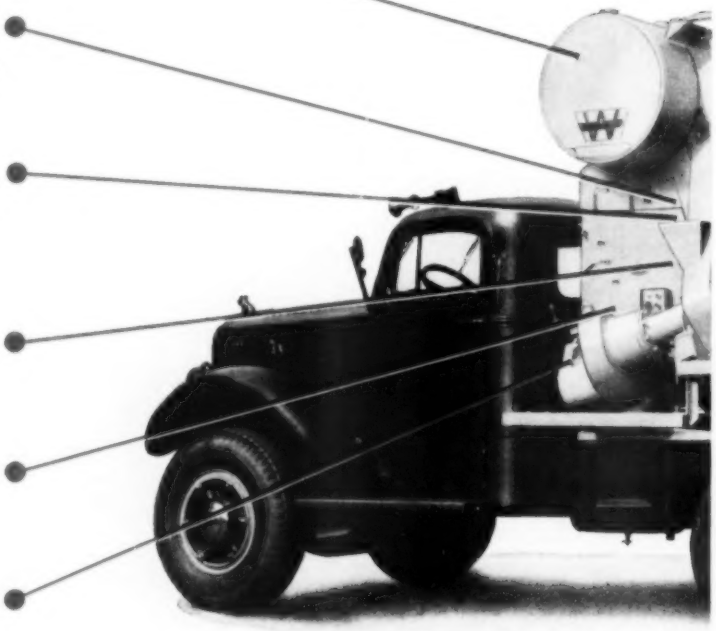
SPECIAL STEEL DRUM SPROCKET of unusually large diameter reduces torque, minimizes effects of starting and stopping with heavy loads.

DRUM SPROCKET SEAT, tire and drip ring end are machined *after* all welding is completed—thus eliminating possibility of heat distortion. Drum runs absolutely true.

WORTHINGTON-DESIGNED Timken-equipped trunnion bearing offers maximum flexibility.

HIGH CAPACITY, double V-belt-driven Worthington water pump, equipped with efficient disc-type clutch.

HEAVY-DUTY TRANSMISSION is designed and built by Worthington. Forward and reverse clutches and brake are completely enclosed and run in oil. Single lever operation.



The new Blue Brute Truck Mixers are the product of nearly a century of mixer building experience.

Weight distribution has been engineered so that the center of gravity is well forward of the rear axle—enabling you to carry the maximum legal payload.

Rigid field and factory tests assure you of trouble-free operation and easy maintenance—with all parts requiring maintenance readily accessible.

The modern Blue Brute is available in capacities of 3, 4½, and 5½ cubic yards, with respective agitator ratings of 4¼, 6⅛, and 7⅜ cubic yards.

Learn more about the new Blue Brute—the truck mixer that is the ideal combination of light weight, strength, and durability. Write your nearest Worthington Blue Brute distributor or Worthington Corporation, Construction Equipment Division, Plainfield, New Jersey.

truck mixers . . .

distribution—

maximum legal payloads

FAST CHARGING HOPPER is equipped with the simplest, easiest to operate control available—no chains, worms or sprockets.

AUTOMATICALLY WELDED, overlapping drum joints for greater strength at drum seams.

LIGHT-WEIGHT, STRONG, die-formed distributing chute is shaped to permit unobstructed flow of concrete.

CHILLED-FACE DRUM ROLLERS are self-cleaning and thoroughly sealed against dirt. High-carbon, deep section drum tire is automatically welded to drum.

FULLY EQUIPPED, the 4½ cu yd closed end Blue Brute truck mixer weighs less than 6800 lbs. The open end mixer (same capacity) weighs less than 6200 lbs.

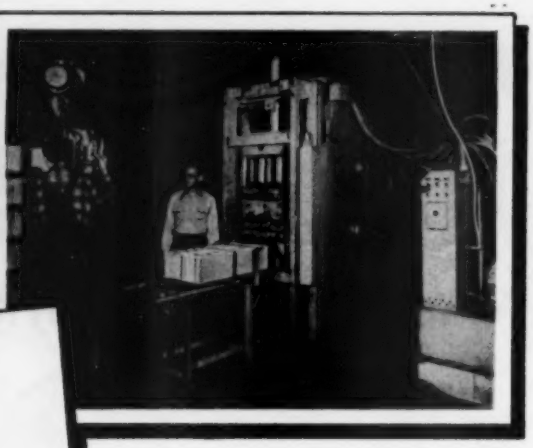
R.2.4

If It's A Construction Job, It's A *BLUE BRUTE* Job

WORTHINGTON
Construction Equipment

Blockmaster Best Buy

FOR THIS DENVER OPERATOR



VIBRATED CONCRETE COMPANY

PHONE TAbor 7707 • 38TH AND WYANDOT STREETS

DENVER 8, COLORADO

Multiplex Machinery Corporation April 7, 1952

Elmore, Ohio

Gentlemen:

We are happy to send you the enclosed order for our second Blockmaster machine, together with mold boxes, pallets and racks, as specified.

We want you to know that we are very much pleased with our first Blockmaster, which has been operating for six months now and has more than satisfied us. We are convinced that two of these machines will really do wonders for us.

Anything you can do to speed delivery of the new machine will be much appreciated.

Very truly yours,
VIBRATED CONCRETE COMPANY
Don Wheelock

Vibrated Concrete Company of Denver likes fast production of top quality block because it means greater profits. It's as simple as that. Finding their competitive position so improved with their first Multico Blockmaster No. 2 (pictured above) they want another as quickly as possible.

Both the Blockmaster No. 2 (2 blocks per cycle) and the Blockmaster No. 3 (3 blocks per cycle) are fully automatic machines, requiring labor only to offbear the block. They are hydraulically powered by a separate power unit which can also serve future machines. Machine action is smooth and quiet, and as the Blockmasters have 50% fewer moving parts than other machines, costly maintenance is kept at an absolute minimum.

The Blockmasters have an unbeatable compression action, producing perfect blocks. With their plain pallets they produce any size or style of block, with any aggregate.

These up-to-date, proven machines can help you too; write or call Multiplex for more information.

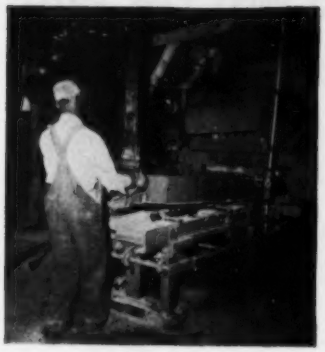
Multiplex Machinery Corporation has been making concrete production machinery for over 40 years. Our engineers will help you plan your plant expansion. We can show you how Multiplex automatic block machines, mixers, skip hoists, and compartment aggregate bins can make your operations more profitable.

Left: the Multico Blockmaster No. 3. Choose this hydraulically powered machine for modern, high production performance.

MULTIPLEX MACHINERY COMPANY

DIVISION OF MULTIPACK, INC. • ELMORE, OHIO

VALUABLE NEW SERVICES for Vibrapac Owners



Showing two pallets with blocks being removed with off-bearer

●

Many satisfied customers operating scores of machines.

●

Write for name of Oswalt-Serviced plant nearest you.

. . . engineered by OSWALT

for *smoother* production of *better* blocks

New SHOCK-FREE BLOCK EJECTOR AND FRONT PALLET FEEDER

Assures smooth gentle motion in block delivery from mold and eliminates green cracking. Culls reduced to minimum.

Pallets automatically fed back through magazine to mold box from front end of machine, which saves time and simplifies handling.

New SIMPLIFIED DEVICE FOR HEIGHT AND DENSITY CONTROL

Correct, uniform height of blocks is assured automatically by control of the vibrating motors, while the adjustment of a special timer maintains constant density. Signal light system enables operator to govern feed so as to compensate for variations in mix.

Entire mechanism is so compact that space under rear of machine is clear of chains, shafts and gears, making clean-up easy and safe for workmen.

All these added features of Oswalt Service are designed to handle block production up to speeds of 1080 units or more per hour . . . without sacrifice of quality or the cracking of green blocks.

OSWALT ENGINEERING SERVICE CORP.
1335 Circle Ave., Forest Park, Illinois
Phones: EStebrook 8-3666 · FOrest 6-3898

HEART OF A MODERN CONCRETE PIPE PLANT

Pipe-making operations in this huge plant of Lafayette Concrete Pipe Company of Lafayette, Louisiana, are *centered around a DIXON Model C Hydraulic Pipe Machine.*

With a five man crew, this machine produces over 3000′ of pipe per 8 hours! That production, the low operating costs and overnight service on wearing parts are a few of the reasons so many DIXON Model C Machines are used in modern pipe plants all over the country.

For the complete story on the DIXON Model "C" Pipe Machine, write for a copy of our latest catalog.

HOUSTON CONCRETE MACHINERY CO.
Office and Mailing Address: 116 Heights Blvd. HOUSTON, TEXAS
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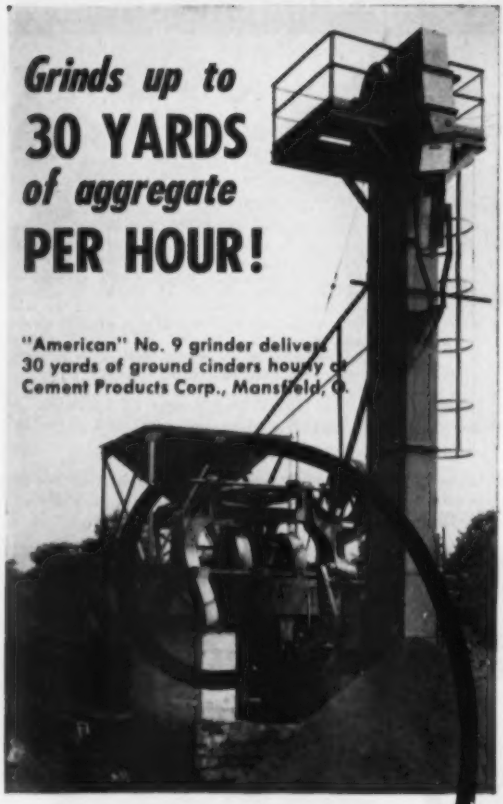
Manufacturers of:

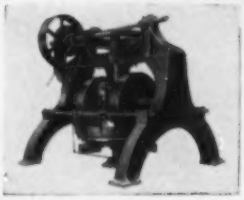
Dixon Pipe Machines	Septic Tank Forms
Pipe Bend Machines	Dixon Conveyors
Dixon Mixers	Off-Bearing Carts

Grinds up to 30 YARDS *of aggregate* PER HOUR!



"American" No. 9 grinder delivers 30 yards of ground cinders hourly at Cement Products Corp., Mansfield, O.

HERE'S WHY AN *American* GRINDER IS THE *RIGHT* GRINDER FOR YOUR PLANT . . .



- Needs no screen plates
- Handles material wet or dry
- Adjustable to your volume and size requirements
- Requires only minimum maintenance
- Has low power consumption
- Good for years of trouble-free operation

YOU CAN'T BEAT AN "AMERICAN" FOR GRINDING

- CINDERS
- HAYDITE
- PUMICE
- SLAG

and a wide range of quarry and mine products.

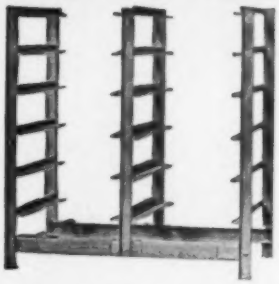
If accurate grinding, in volume, poses a problem in your plant . . . ask for a non-obligating consultation with the "American" grinding specialist . . . write, wire or phone.

***American* GRINDERS**

W. A. RIDDELL CORP., BUCYRUS, OHIO

CHASE BLOCK RACKS, CARS, PALLETS

Corrosion-Resistant Hi-Strength Alloy Steel



For Fork or Platform Lift Trucks

CHASE — THE LAST WORD IN

- *DURABILITY*
- *ECONOMY*
- *EFFICIENCY*

Sturdy construction • any style or capacity • Shipped knocked down • Rigid Field connections • assembled Easily

CHASE Foundry & Mfg. Co.

COLUMBUS 7, OHIO

LARGE PROFITS PRODUCING

Smoother, thicker, more uniform

MARVEL DRAIN TILE

The better tile — Better looking Better selling

Low cost, ruggedness, and dependability make the

MARVEL, JR.

CONCRETE DRAIN TILE MACHINE

a must in plants both large and small. The MARVEL JR. is famous for the smooth, symmetrical, full flat-ended tile it produces—a big selling feature and the reason why your customer prefers them over tile made on more expensive competitive machines. Write for detailed bulletin at once.

CONCRETE MACHINERY CO.

DRAWER 60A — HICKORY, N. C.

A LABEL OF QUALITY

Manufacturer of Complete Line Cement Block Machinery • Machines — Pallets • Mixers—Conveyors • Air Hoist

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BEFORE YOU BUY WRITE — WIRE — CALL

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100 S. Westmoreland Drive — Orlando, Florida

1952 in Review!

Has Construction Increased Over Previous Years?
What About Cement Production?
Have Aggregate Sales Increased?
What's the News of Other Non-Metals?
Who Has Developed New Machinery?

AND WHAT ABOUT 1953?

Will the Economic Trend in the Pit and Quarry Industries Go Up or Down?
What About Long Range Planning?
Can the Industry Expect Continued Growth?

The January 1953 issue of PIT AND QUARRY, the Annual Review and Forecast Number, is 'MUST' reading for everyone in the PIT AND QUARRY industries.

This issue, 1952 in Review and the Outlook for 1953, is one you will refer to many times during the year. The one issue you will want to keep handy and intact, quickly available for use in planning production and expansion.

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If you aren't a regular subscriber to PIT AND QUARRY, use the order form below. We will start your subscription with the big January issue. Just $3 for twelve big issues.

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Spectra-Glaze*

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Burns & Russell research has developed a method of glazing masonry units utilizing regular low pressure steam facilities.

You can now convert part of your block production to glazed facing units for an extremely low investment in plant and equipment.

The process is simple. The market is vast. The profits are long.

Our chemical engineering service and know-how are at your disposal.

THE BURNS & RUSSELL COMPANY

Tower Building **Baltimore 2, Maryland**

See our display in Booth 46, NCMA Exposition in Cleveland

Is Materials Handling Over ROUGH Ground YOUR Problem? . . .

6 TRACTO-LIFT MODELS
• Lifting height to 25'
• Lifting capacities 3,000-15,000 lbs.
• Fork lengths 36"-100" in 6" variations.
• Power steering and dual tires available at small extra cost.
• Climbs inclines up to 20%.
• Parts and service for standard industrial tractor unit available throughout the world.
• Complete line of versatile attachments available.

Then consider that problem *solved* with TRACTO-LIFT—King of the fork lift trucks. Engineered and built for the tough jobs where rough, unpaved ground *demands* a high clearance underneath, TRACTO LIFT features oversize pneumatic tires with maximum traction. Even rough weather can't stop TRACTO-LIFT! Built for maximum versatility, it handles heavy loads at the higher speeds of industrial tractors. Yet for all its advantages, TRACTO-LIFT still costs less than any other fork lift of equal size and capacity.

Write TODAY for complete specifications, illustrated brochure, and the name of your nearest dealer.

TRACTO-LIFT Company

800 East 18th St. Kansas City, Mo.

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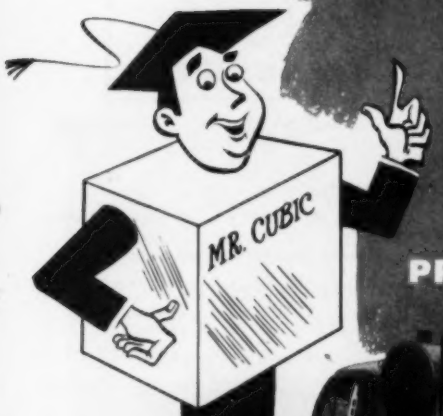
STANDARD OF THE INDUSTRY

...for sizes...for low cost operation and maintenance... for lightweight, quality construction

FOR PROFIT



Member N.R.M.C.A.

Today, more and more operators, in order to realize the most value from their equipment investment, consider the truck and mixer as a single, integral unit . . . one complementing the other. It is necessary, therefore, to analyze the rated NRMCA capacity of the mixer, together with the legal and physical capacity of the truck on which it is to be mounted. Only with Challenge, which offers a selection of six different size truck mixers, can operators make greatest profit-making truck mixer combination . . . a combination that carries maximum legal payload in accordance with state highway weight regulations, at lowest cost per yard of concrete.

A new booklet . . . just out . . . entitled "Challenge Sizes" shows you the size truck best suited for your Challenge Mixer . . . how Challenge helps you receive a bigger return on your investment. Send for it today. It's free! Remember, only Challenge has 3, 3½, 4, 5, 6, & 6½ cubic yard size truck mixers, the nation's widest selection . . .

STANDARD OF THE INDUSTRY!

COOK BROS.
EQUIPMENT COMPANY
1813 No. Broadway, CApitol 2-9111
Los Angeles 31, California

Exclusive National Distributors for CHALLENGE, The Modern, Streamlined Truck Mixer

Cook Bros. Equipment Co.
Please send me, without obligation, your booklet entitled, "Challenge Sizes."

NAME _____

ADDRESS _____

CITY _____ STATE _____

"WE QUIT changing burned out brake coils!"

. . . say the users of M&M Brake Coils for Stearns Magnetic Brakes.

M&M Brake Coils are *guaranteed burnout proof.* They completely eliminate down time spent changing burned out brake coils.

Write today giving coil number and voltage

Another First for
M&M ENGINEERS

1017 W. 23rd St. IMP. 5496
INDIANAPOLIS, INC.

M&M ENGINEERING CORP.

BETTER KILN CLOSURES

Universal Door and Carrier equipment in use at Superior Concrete Products Co., Augusta, Ga.

● Can help you cut your cost per block and improve your quality-uniformity—by stopping costly losses of heat and steam—and preserving uniform temperature and humidity. Two *very* good reasons for you to investigate

UNI-TEMP insulated all-metal DOORS* & UNIVERSAL world-famous DOOR CARRIERS

*Doors also furnished hinge-mounted.

Let us give you full information about the most efficient kiln closure equipment you've ever seen—at a cost that is probably *much* less then you expect!

Write, wire or phone:

UNIVERSAL DOOR CARRIER, Inc.
1117 Cornell Avenue
Indianapolis 2, Indiana

Ask the Operator! . . . it's the "QUALITY KING"

Hi-Lo TOUCH MIXER

HI in Quality—LO in Cost

TRUCK MIXER
"Visible Mixing"

Demand the Badge of Dependability.

Rotor action produces a kneading, folding, blading which provides a homogeneous mix.

SEE The "HI-LO" Mixer at the National Concrete Masonry Convention, Cleveland, Ohio, in January.

CONCRETE TRANSPORT MIXER CO.

Phone Flanders 7800
4989 FYLER AVE. • ST. LOUIS 9, MO.

Serving the CONCRETE INDUSTRY OVER 20 YEARS

All-welded ELEVATOR BUCKETS

light • durable • quick cleaning

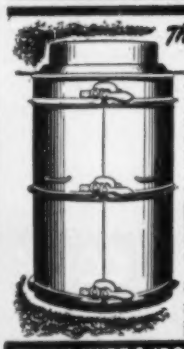
For maximum elevator capacity with minimum h.p. requirements, use Johnson cement and aggregate buckets. All-welded steel, with heavy-gauge lips and ends, they're light, durable, smooth for fast filling, quick cleaning. Three sizes cement: 10x6", 12x7", 14x8" . . . 4 aggregate: 10x6", 12x8", 14x8", 16x8".

Long-life steel chain has carburized steel knuckles, medium carbon steel side bars, welded bucket lugs, alloy heat-treated ⅝" pins. You'll find that carburized steel parts last longer than malleable iron.

Mail to C.S. JOHNSON CO. Champaign, Ill. (Koehring Subsidiary)

Send information on: ☐ buckets ☐ elevator chain for _____ (type of material)

NAME _____ CO. _____
STREET _____
CITY, STATE _____ 3243PQ



The "Quinn Standard" FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request. Also manufacturers QUINN CONCRETE PIPE MACHINES.

QUINN WIRE & IRON WORKS 1627 12TH ST. BOONE, IOWA

looking for something new?

(It will be a long stretch before you see another show like this one.)

you'll see the newest . . . you'll hear the latest at the . . .

8th CONCRETE INDUSTRIES EXPOSITION

and the

33rd annual NATIONAL CONCRETE MASONRY ASSOCIATION convention

See the machines, materials and methods that will make profits for you in '53.

Meet the experts of production, research and merchandising.

See the big displays of cost-saving, profit-making equipment and materials for the concrete industries.

Hear and discuss in open-forum sessions your mutual problems with leaders in the industry.

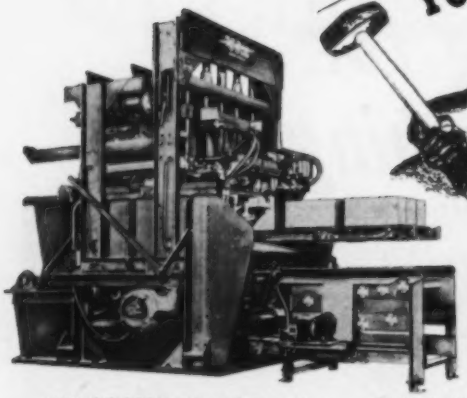
You'll enjoy four profitable days and learn many new and practical ideas that will improve your production and profits.

When? **January 26 thru 29 . . .**

Where? **Cleveland Public Auditorium**

ATTENTION: Make your hotel reservations NOW! Address reservations to: Louise D. Perkins, Director, Cleveland Housing Bureau, 511 Terminal Tower, Cleveland 13, Ohio

YOU PACK YOUR BLOCKS



With a GOCORP!

You don't drive a nail with a rubber hammer . . . nor can you get the best block compaction when pallet support depends on rubber or springs. GOCORP clamps the pallet to the mold . . . Vibrates the combination (pallet and mold) with sharp, swift sledge hammer blows . . . No cushioned deceleration common to other machines. Whiplike direction change at each end of the stroke means faster pickup during the stroke and a harder packing blow.

With GOCORP plain pallet machines . . . the King—6 at a time . . . the Senior (illustrated)—3 at a time . . . the Prince—2 at a time . . . You also get:

- **100% Hydraulic Operation**—adjust any operation without affecting others.
- **Main Hopper Feed** — no old fashioned feed drawer.
- **One Man Operation**—reduces labor cost.
- **Front Pallet Feed**—saves space, reverses pallet each time used.
- **The BEST in service.**
- **Other GoCorp Equipment**—Junior Cored Pallet Block Machines . . . Batch Mixers . . . Pipe and Tile Machines.

THE GENE OLSEN CORP.

403 Grace St. Adrian, Mich. Phone 2120

To convert from dry batch to Central Mix, for a package central mix plant, or a semi-portable plant, write: SuPREMIX, Incorporated (an affiliate of GoCorp), 401 Grace Street, Adrian Michigan.

Follow the KENT Continuous Mixing Trend to GREATER PROFITS!

WRITE FOR BULLETINS Describing All 3 *KENT* Continuous Mixers

The KENT Continuous MIXER receives material *continuously*, mixes it *continuously* and delivers it *continuously*.

The operator SETS it—STARTS it and LEAVES it—to devote his time to other important work.

The tremendous American output of goods, never even remotely approached anywhere in the world, has been due in large measure to straight line production.

When this advanced method was first gaining acceptance Kent machines were already applying this principle in the continuous mixing of concrete.

Each year since then Kent Mixers have been accorded wider acceptance as block manufacturers have applied more efficient methods to their production problems.

Today more and more of them are turning to Kent Continuous Mixers both to increase their output and to more effectively meet competition through lowered costs. Three sizes are now available to meet all demands—including the very largest block machines.

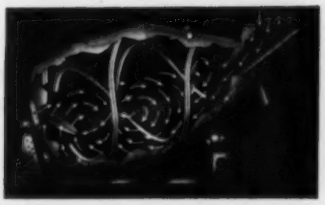
Isn't it time for you to hear the complete story, especially since you can get it quickly, clearly and without obligation?

The KENT MACHINE CO. Cuyahoga Falls, Ohio

Manufacturers of* CONCRETE PRODUCTS MACHINERY *Since 1925

All these advantages *plus* top payload are yours in the Jaeger "Mix Plus"

Up to 1200 lbs. lighter than 1951 models



The one and only "Dual Mix" drum

Basic reason for Jaeger leadership. Fastest to charge, to mix, to discharge. Produces higher strength concrete and is designed for 8 to 10 years' service compared with 4 to 5 year life of cheaply-built mixers that weigh as much or more than Jaeger and cost as much or more to buy.

The only open end loader with an instant-opening gate

Eliminates problem of cement blow-back and water spillage when charging. Gives complete control of load.

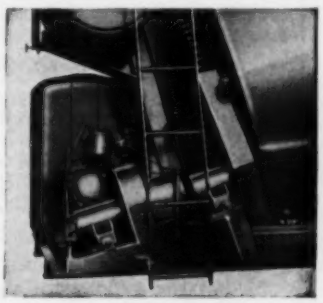
The only sealed end loader with a perfected grout-proof seal

Ideal for agitators or reverse mixing on paving work. One wheel-turn opens it. One shot lubricates and flushes seal.

The only 3-piece "To-the-Spot" chute and swing-away hopper

Meets all conditions: places concrete where the customer wants it.

No need to remove chute head to discharge into extra big buckets or high forms. Chute head, plus 2 extensions, gives choice of 5'-8'-10' or 13' lengths. Chutes are wider, deeper, to handle the faster discharge of the Jaeger "Dual Mix" drum.



The only truck mixer with "Cematic" hydraulic power transmission

Gives finger-tip control of drum with either separate engine or truck engine drive.

Engine power does all the work. Automatic brake positively prevents shock load to transmission gears when reversing drum rotation. Specifically designed for truck mixer service; far simpler, safer and more dependable than the finest multiple clutch transmissions, and eliminates the problem of maintenance.

Chrysler engine, with fluid drive and automotive transmission with straight-line shift, also available if desired.

Jaeger-engineered chain drive (used for over 15 years on Jaeger side discharge truck mixers) employs replaceable tooth sprocket of 56" diameter and 2" pitch, 1½" roller chain; has at least 100% longer life.

For full information see your Jaeger distributor

THE JAEGER MACHINE COMPANY

602 Dublin Ave., Columbus 16, Ohio

World's largest builder of TRUCK MIXERS, AGITATORS • PUMPS • COMPRESSORS • CONCRETE MIXERS • PAVING MACHINERY

the FORNEY Compression TESTER

Sells Your Products - - - Increases Your Profits

Whether you produce concrete building units, concrete products or just concrete — daily testing will increase yields, profits and customer confidence.

The FORNEY direct reading gauge makes daily testing easy and profitable.

Write for complete information

FORNEY'S inc. 203 ELM STREET · NEW CASTLE, PENNSYLVANIA

USERS OF

The Lightweight Aggregate **SHALITE** *Of Controlled Quality*

GET - - -

- HIGH YIELD — 25 to 35 8-inch blocks per bag of cement.
- LIGHT WEIGHT — 40% less than heavy aggregate blocks.
- HIGH STRENGTH — 4000-6000 psi on structural mixes.
- LOW ABSORPTION — As much as 25% below other lightweight units.
- INSULATING VALUE — Double that of heavy concrete.
- NAILABILITY — With excellent holding quality.
- PERMANENCE — No corrosion, no pop-outs, completely inert.

SHALITE is an expanded shale aggregate manufactured by the sintering process under continuous laboratory control.

Phone, Wire or Write

SHALITE CORPORATION

BOX 441 KNOXVILLE, TENN.

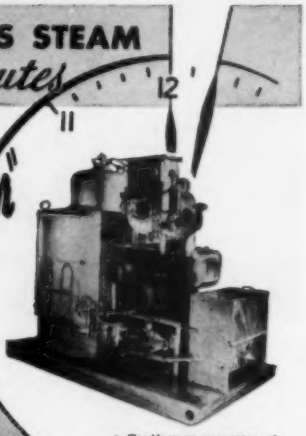
PRODUCES STEAM *in 2 minutes*

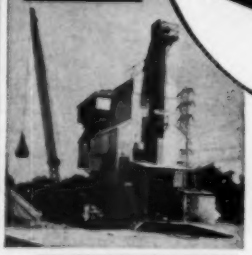
LITTLEFORD

"Kwik-Steam"

VAPOR-CLARKSON GENERATOR

...for READY MIX CONCRETE



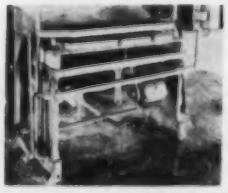


• Continuous operation of Ready Mix Concrete Plants is now assured by heating the aggregate and water with a Littleford "Kwik-Steam" Generator, 60° Concrete can be delivered safely in the coldest weather. This "Kwik-Steam" Generator produces steam from a cold start in 2 minutes' time; it gives steam only when steam is needed as the burner cycles off and on automatically. Burning low cost fuel oil, the "Kwik-Steam" Generator is economical in operation, then too, it saves up to 50% in labor as no experienced operator is necessary to run this unit. Made in sizes from 20 to 165 BHP, with either electric motor or gasoline engine. Write for Ready Mix Concrete Bulletin.

LB LITTLEFORD

LITTLEFORD BROS. INC.
453 E. Pearl Street, Cincinnati 2, Ohio

Boost Block and Brick Profits $



with the

APPLEY *Little Giant*

Slump Brick and Slump Block Machine

Modern, vibration-type machine, featuring interchangeable mold and plain pallet-rack. Makes 6 to 15 slump bricks or blocks per cycle, in many shapes and colors. Lengths of units, 8", 12" and 16". Thicknesses from ⅝" to 4". Units applicable to commercial and residential construction. Write for literature.

SIMPLE OPERATION
HIGH PRODUCTION
LOW MAINTENANCE

J. W. APPLEY & SON, INC., P.O. Box 849, Station A, St. Petersburg, Fla.

Memo . . . "must write today" for full information on

CARPENTER *Profit-Boosting*

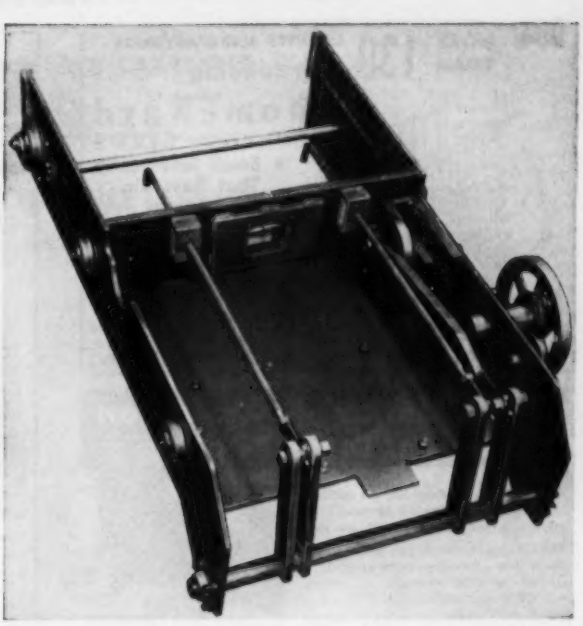
SEPTIC TANK FORMS AND HANDLING EQUIPMENT

Concrete producers from coast to coast are reaping extra profits from septic tanks made with CARPENTER Equipment. This method assures big output of quality units, economically produced. One man handles our delivery rig.

CARPENTER MFG. CO.

Phone 22018, R.F.D. 1, Box 470, Richmond 23, Va.

when you aim for top quality ....THIS IS FOR YOU



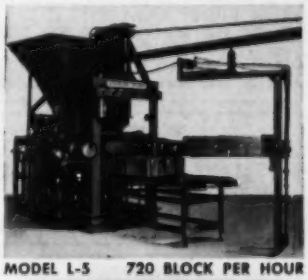
THE ability to turn out consistently superior block is no accident. Every successful block man knows that it takes the right combination of an experienced operator *and* an outstanding machine . . . a machine like the Lith-I-Block. Truly, here is the machine that is designed in every detail with just one aim. It is built to give you top volume at a really low unit cost and, most important of all, Lith-I-Block gives you unexcelled quality day after day. No matter what aggregate you use, no matter what type of block you are making, you always get uniform density, evenly textured surfaces and edges as true as a die.

To achieve this quality at the head-long pace of normal production takes almost superhuman control over each step in the block cycle. And one of the key elements that makes this control possible in the Lith-I-Block is a special kind of feed drawer . . . a feed drawer that is ruggedly built to give superb performance. Here, while the aggregate is carried forward to the mold box, two shaker bars oscillate 275 times a minute. They break the aggregate down into an even, smoothly flowing stream so there are no lumps or hollow spots to interrupt the compacting action in the mold. Results . . . the uniform aggregate distribution that contributes so much to Lith-I-Blocks famous quality.

TO BUILD PROFITS *and* PRODUCTION

1 If you want to keep your phone ringing with orders, look into the many, many advantages that Lith-I-Block alone offers. Write for the free booklet "THE MACHINE THAT BUILDS SUCCESS".

2 And when you write, ask for the names of nearby Lith-I-Block producers. Visit these Lith-I-Block plants, look at the records, see how Lith-I-Block features pay off in the hard grind of daily production.



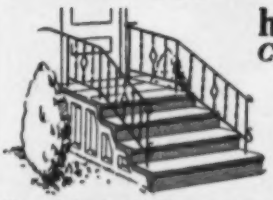
MODEL L-5 720 BLOCK PER HOUR

SALES AND SERVICE from COAST to COAST

THE LITH-I-BAR COMPANY

DEPT. CM-12, HOLLAND, MICH.

NOW MORE THAN 130 LICENSED MANUFACTURERS Producing

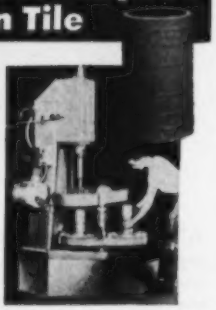


Patented
homeward Concrete STEPS
A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.
For Complete Information Write
ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

Make Money with Champion Cement Drain Tile



More millions of drain tile are needed to supply ever growing demand. The market is broad and profits are big.

The Champion makes the world's best drain tile. Densely compacted . . . ribbed for extra strength . . . every one truly concentric.

Champion machine is simple, compact and really rugged. Automatic feeder (optional) makes for 1-man operation. Write for literature — gives facts about the business and the equipment.

Concrete Equipment Co.
532 Ottawa Ave., Holland, Mich.

Better concrete building units can be made on the best steel pallets. Your units will test higher, be more uniformly sized and have sharper edges when produced on "COMMERCIAL" CLOSE CLEARANCE STEEL PALLETS.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
1775 LOGAN AVE. YOUNGSTOWN 1, OHIO

DISTRIBUTOR WANTED FOR THE UNITED STATES, CANADA, CUBA, ETC.

FOR A NATIONALLY KNOWN BLOCK MACHINE. THIS MACHINE IS THOROUGHLY PROVEN AND IN USE FOR MANY YEARS ALL OVER THE WORLD. A VERY INTERESTING PROPOSITION IS OFFERED TO THE RIGHT PARTIES.
WIRE OR WRITE BOX NO. Z-29, c/o THE CONCRETE MANUFACTURER
431 S. Dearborn St., Chicago 5, Ill.

FOR SALE
One—Lith-I-Bar (2-block) Machine priced for quick sale.
One—4" Attachment for #9 Joltcrete including over 6500 modular width 4" steel pallets, like new.
JACK ELLS, 119 Ann St., Hartford, Conn. Tel. 2-0036

VERY REASONABLE
Complete cement block equipment. 2 machines, conveyors, mixer, racks, motors, switches and wiring to start immediate production. Reason, owners health and loss of lease. Part cash, balance long terms.
E. F. GERMAIN
623 So. Warren Avenue Saginaw, Michigan

MINERAL COLORS for BRICK MORTAR STUCCO-PLASTER-CONCRETE
"Fine Because of Their Fineness"
Ask for samples and recommendations.
BLUE RIDGE TALC CO., INC.
HENRY, VIRGINIA

100,000 PRESSED STEEL PALLETS In Stock
Send tracing or pallet for quotation.
GENERAL CONCRETE EQUIPMENT CO.
307 Hunter Street
Dept. PQ
Gloucester, New Jersey

WANTED
Cement Block Machinery to Make 1000 to 1500 blocks daily. Price must be right and no junk. Send full details and price.
Box No. Z-33
c/o Concrete Manufacturer
431 S. Dearborn St., Chicago 5, Illinois

FOR SALE
Besser 25 ft. Mixer, Newly rebuilt with all new parts, with or without 25 HP motor; also Stearns 28 ft. vertical skip hoist with all controls, motor, etc., good condition—discharges 11½ ft. above floor. Will sell both together.
SPEIGNER CONCRETE BLOCK CO.
P. O. Box 1066 Dothan, Alabama

FOR SALE DUNBRIK MACHINE
1—Dunbrik Machine with Motor
1—18 cu. ft. Mixer with Motor
21—Brick cars 720 brick each
4500—Pallets
1—Hydraulic Jack
All perfect condition. Price $3000.00. Cost $14,000.
IREDELL BRICK COMPANY
Box 1262 Statesville, N. C.

WANTED
Sales representative for automatic cement block making machinery and auxiliary equipment. Exclusive territory. Applications confidential.
BOX NO. Z-28, c/o The Concrete Manufacturer
431 South Dearborn Street, Chicago 5, Illinois

FOR SALE
One practically new NC-Jackson and Church Brick machine. Used less than 20 days—Will turn out ten to fourteen thousand bricks per days. Machine in perfect condition. Priced for quick sale $2500.00
C. S. WHITTINGTON
Box 444 Greenwood, Mississippi

FOR SALE
Stearns #7 Joltcrete, control boxes, automatic carriage, height control, 4, 8, and 12" attachments. Complete with modular pressed steel pallets, pallet dunker, turntable, 24 steel racks, Kent #2 continuous mixer.
PONTIAC CONCRETE COMPANY
R. R. #4, Pontiac, Illinois

Wanted for New Plant
2-block or 3-block, fully automatic, plain pallet machine and accessories. Must be in satisfactory condition. Will purchase complete block plant set-up.
Box No. Z-34, c/o Concrete Manufacturer
431 S. Dearborn St. Chicago 5, Illinois

FOR SALE
TOWMOTOR L. T. 60 6000# CAPACITY—84" LIFT CUBING FORKS SIDE SHIFTER — RECENTLY OVERHAULED—$3600.00.
GRAYS FERRY BRICK COMPANY
126 FAYETTE STREET
CONSHOHOCKEN, PA.

FOR SALE
2 Ingersoll-Rand air compressors with oil engine. Type PO, 55 H.P., size 15, class V2. Located New York State.
BOX NO. W-7,
c/o Pit and Quarry Publications
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CONCRETE MANUFACTURER CLASSIFIED SECTION

MAQUINARIA y MOLDES
para fabricación de bloques y tubos de concreto

PIDA CATALOGO
Y PRESUPUESTOS
A. New & used

GEORGE W. HOFFMANN CO.
P. O. Box 452, Sioux City, Iowa, U.S.A.

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

BUILD GOOD WILL

Advertising Necessities for the block industry. Line Pins, Block Laying Sticks, 6" Vinyl Rulers, etc. Also the new Concrete Block Calculator. All imprinted with your advertising. Complete catalog on request.

GERSON COMPANY
97 Deering Rd. Mattapan, Mass.

STOP *that* WATER
With FORMULA NO. 640

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.
HAYNES PRODUCTS CO., OMAHA 3, NEBR.

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 34 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.

manufactured by
LANDERS-SEGAL COLOR CO.
71 Delevan St. Brooklyn 31, N. Y.

FOR SALE

1—Used Stearns Clipper Stripper Model A Complete. A-1 Condition.

Johnstown Coal & Coke Company
1006 U. S. National Bank Building
Johnstown, Pennsylvania

FOR SALE

1—2 yard Smith concrete mixer
1—2 yard Jaeger mixer
1—3 yard Rex mixer
all need some work, will sell cheap.

READY MIXED CONCRETE CO.
P. O. Box 312 Wausau, Wisconsin

EXCEPTIONAL READY MIXED OPPORTUNITY

In connection with the operation of our block business we have the complete equipment installed for the automatic batching of up to 500 cubic yards of central mixed concrete a day. Aggregate supply of high quality sand and gravel adequately provided for. Aggregate bin storage capacity in excess of 2,000 cubic yards reclaimed automatically by conveyors into batching bins equipped with automatic weigh batchers. Bulk cement capacity 3,750 barrels.

We are looking for an experienced, enterprising concrete man who would like to put these facilities to work. He would have to supply his own concrete delivering equipment and set up and maintain his own sales operation. Obviously, only an experienced and financially responsible party could be interested in our proposal.

This business is located in one of the fastest growing university cities in the North Central states. Population 110,000 in the heart of a thriving dairy and agricultural market.

Our reason for wanting to make such an arrangement is that our concrete block and allied precast concrete business requires our entire capital and attention.

BOX NO. Z-31, c/o CONCRETE MANUFACTURER
431 S. DEARBORN ST. CHICAGO 5, ILLINOIS

SPACE HEATERS
War Surplus Bargain
New — Ready To Use!
40,000 BTU capacity

—Burning gasoline, kerosene or diesel fuel.
—Electric blower—12 V. DC or 110 V. AC using small transformer which we furnish with each heater.

Portable, Quick, Clean Heat

Ideal for curing room, concrete plants, work under construction, emergency heat, or auxiliary heaters.

$95.00 each

Clapp, Riley and Hall Co.
14 No. Clinton St.,
Chicago 6, Illinois

FOR SALE

3—Concrete Mixer Trucks Complete.
MIXERS: — Ransome. 3 Yd., 4¼ adjitator.
Hercules gasoline motors. Hi-Dump. New Paint. A-1 Condition.
TRUCKS:—International 6 x 6 Army type.
Gasoline motors. Good tires. New Paint. A-1 Condition.

VOLZ CONCRETE MAT. CO.
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Box 228, Clayton Station
St. Louis 5, Missouri Phone Winfield 1544

WINTER CLEARANCE

BUCKET LOADERS
Haiss "77-C" **Used** Crawler Bucket Loader
Barber-Greene "552" **Used** Crawler Bucket Loader
Barber-Greene "552" **Used** Rubber-Tired Bucket Loader

TRANSIT MIXERS
Jaeger 3 Yd. **Used** Hi-Discharge Mixer w/-White Truck
Rex 3 Yd. **Used** Hi-Discharge Moto-Mixer, un-mounted

MISCELLANEOUS
IHC "T-9" **Used** Gas Tractor w/Heil Cable Dozer
Cletrac "DGH" **Used** Gas Tractor w/Drott Hyd. Loader, 1100 hours
Martin Semi-Trailer w/1946 Dodge Tractor
Trailer **Used** Tilt-Top Tag-A-Long 9.00 x 20 tires
Universal Port. Pulverizer Plant: Universal #5, Murphy ME-66, Feeder, Screen, Pneumatics, etc.

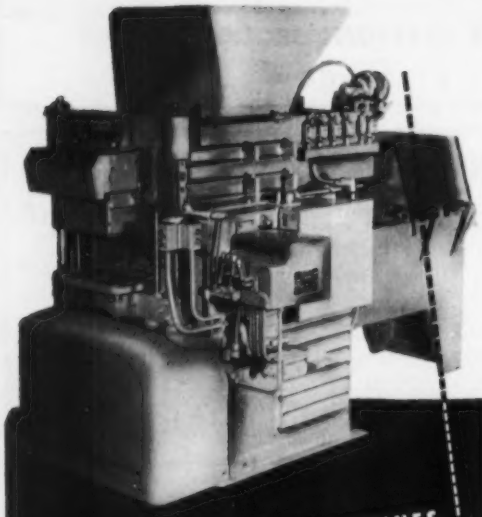
EIGHMY EQUIPMENT COMPANY
ROCKFORD, ILLINOIS

FOR SALE

Sand Lime brick plant complete with Jackson & Church machine, rod mill, cars, conveyors, 52 feet autoclave, etc., located in the Pacific Northwest.

BOX NO. Z-27, c/o The Concrete Manufacturer
431 S. Dearborn St., Chicago 5, Illinois

LOWER COST
PACKER-HEAD WINGS
Proved to last as long or longer—yet cost considerably less. Write for prices.
TEXAS FOUNDRIES
LUFKIN, TEXAS



Columbia BLOCK MACHINES "LEAD the FIELD"

...IN LOW INITIAL COST... HIGH PRODUCTION AND ECONOMY OF OPERATION

FROM COAST-TO-COAST, operators find the Columbia line a leader in its field! Its compact, rugged construction assures longer performance under most severe operating conditions ..moving, rotary parts are made with needle bearings, hardened pins and enclosed within the machine for protection from grit.

COLUMBIA'S 100% oil hydraulic, fingertip controls and automatic pallet feeder offer higher production capacities and utmost economy. Its flexible operation—from fully automatic to manual in a flip of a switch—is an advantage when changing molds or starting or ending a shift.

THE COLUMBIA IS SIMPLE IN DESIGN and produces precision, modular blocks from over 200 different types of molds and uses either light or heavy weight aggregate. Parts are standard. Steel or wood pallets may be used. Dollar for dollar—the finest machine on the market today! Write for complete details.

SALES AND SERVICE THROUGHOUT THE WORLD

There is a Representative in Your Area
Write for Name and Address

Columbia MACHINE WORKS
107 S. GRAND AVE. VANCOUVER, WASH.

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*See also Detailed Information in 1952 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

TAKE STEPS *NOW* to make LARGE PROFITS

from a SMALL INVESTMENT

PATENTED

Pre-cast Concrete Steps

These easy-to-make, attractive steps find a ready market everywhere.
DON'T WAIT — INVESTIGATE!
A *Real Business — Not a Side Line*
Exclusive Territories available — Write for details.

PITTSBURGH PRE-CAST CO.
2615 W. LIBERTY AVE., PITTSBURGH 16, PA.

Another Leader IN THE PRODUCT INDUSTRY PREFERS BESSER VIBRAPACS!

"I Use Besser Equipment because of the Built-in Stamina that Gives Top Production Every Day"

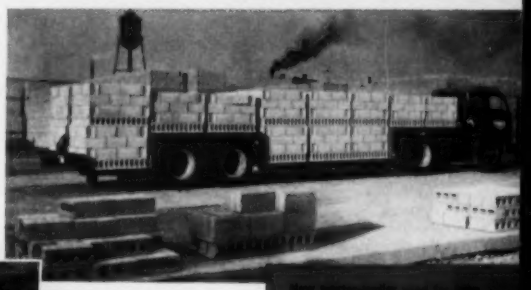
This frank statement comes from Virgil E. Cook, General Manager of Cook Block & Brick Company, Anderson, Indiana. The company installed their first Besser Vibrapac machine in 1946. Today they produce 66 sizes of concrete block and brick, specializing in Celocrete lightweight masonry units. More than a million 8" modular units are produced each year.

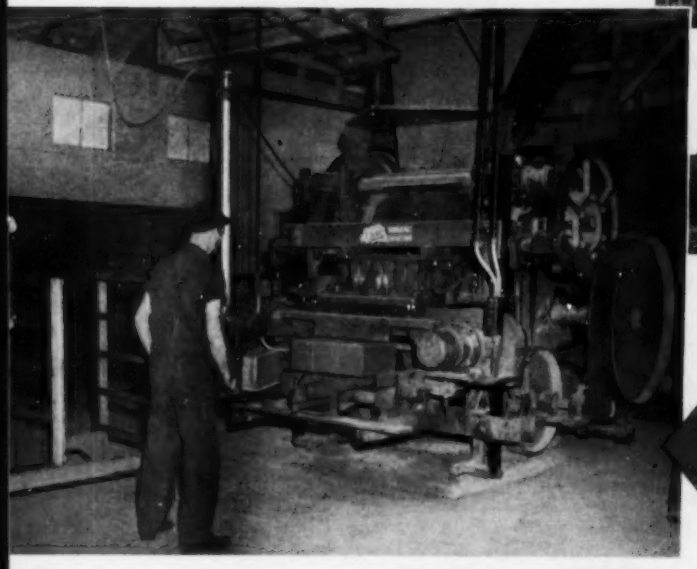
Mr. Cook states further: "When I installed my Vibrapac, I was relatively a newcomer in the business. So I did enough research to learn that the majority of the leaders in the industry were using Vibrapacs. I concluded that all of these successful business men could not be wrong".

If you intend to erect a new concrete products plant . . . or expand your present plant . . . consult a Besser engineer. He will gladly give you the benefit of his broad experience in this specialized field.

BESSER MANUFACTURING CO., Alpena, Michigan, U. S. A.

Complete Equipment for Concrete Products Plants





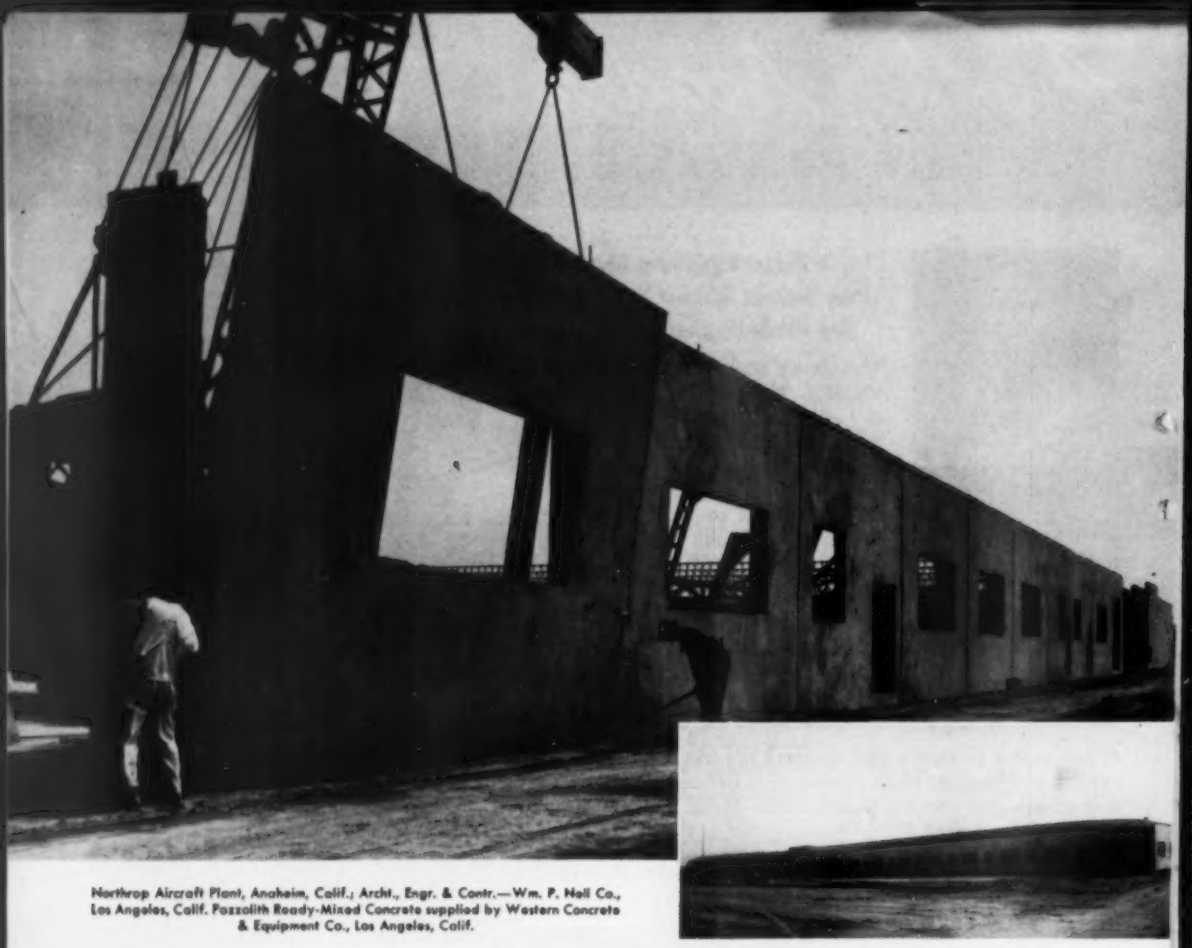
★ This is the 58th of a series of ads featuring leaders of the industry who are stepping up block production with Vibrapacs.

The heart of the Cook plant is the Besser Super Vibrapac — the modern, fully automatic concrete block machine. It produces three 8" x 8" x 16" modular units at a time on one plain pallet. Other sizes produced in equivalent multiples on the same set of plain pallets. No machine operator is required. Hand labor is reduced to pushing a switch button and guiding a power off-bearing hoist.

A 7290-1PBC

BESSER

BATCH MIXERS | SKIP LOADERS | BLOCK & BRICK CUBERS | SUPER VIBRAPAC | SINTERING PLANTS | ACROW CENTERS | ROOF TILE MACHINE



Northrop Aircraft Plant, Anaheim, Calif.; Archt., Engr. & Contr.—Wm. P. Hall Co., Los Angeles, Calif. Pozzolith Ready-Mixed Concrete supplied by Western Concrete & Equipment Co., Los Angeles, Calif.

POZZOLITH READY-MIXED CONCRETE.... better, faster, in Tilt-Up Construction

Pozzolith Ready-Mixed Concrete is used extensively in tilt-up construction because it helps builders produce units faster and aids in overcoming shrinkage, crazing and cracking.

In tilt-up construction, as in all types of concrete work, Pozzolith Concrete provides these important advantages:

- EASIER PLACEABILITY — for lower placing costs
- MINIMIZED SEGREGATION — for better appearance
- REDUCED SHRINKAGE — for less cracking
- LOWER PERMEABILITY — for less "waterproofing" expense
- INCREASED BOND-TO-STEEL — for better construction
- GREATER DURABILITY — for longer life concrete

Whatever your concrete requirements, Pozzolith will enable you to obtain them *better and at lower cost* because it reduces the unit water content of the mix.

Write for full information on Pozzolith and the importance of low unit water content.

the MASTER BUILDERS Co.

CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO, ONTARIO

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PIT AND QUARRY • 431 S. DEARBORN ST. • CHICAGO 5, ILL.

ADVERTISING RATE PER ISSUE: $8 A COLUMN INCH. LOWER RATES FOR LARGER SPACE USED AND/OR ON A CONTRACT BASIS. WRITE FOR RATE CARD.

CLOSING DATE: 20th OF THE MONTH PRECEDING DATE OF PUBLICATION

[*Additional Classified Ads on Pages 192, 193*]

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Patent and Trade-Mark Causes

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WASHINGTON 15, D. C.

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

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Phone: 1828

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Ph. FR 2-4186

Operation
Plant Layout
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CORE DRILLING ANYWHERE

We look into the earth

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH 20, PA.

WANTED

72" or 84" Telsmith
Super Scrubber or similar

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Saginaw, Michigan
Telephone 2-8189

WANTED

6—36" Gauge, All Steel, 4 to 5 cu. yd., Side Dump, Quarry Cars. Easton-Phoenix, or Lakewood preferred.

J. L. SHIELY COMPANY
1101 No. Snelling Ave.
St. Paul 4, Minn.

WANTED TO BUY

Hough Payloader. Late model. 1—1½ Yard Size. Four wheel drive. Advise details.

BOX No. Y-21, c/o Pit and Quarry Publications
431 S. Dearborn Street Chicago 5, Illinois

WANTED

To Expedite Production—Rock Products Equipment including Rotary Dryers, Kilns, Crushers, Bins, Ball Mills, Vibrating Screens, Filters, Power Shovels & Cranes, Conveyors, Diesel Engines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351, Church Str. Sta.
New York 8, N. Y.

CEMENT PLANT MANAGER

Open for Engagement

16 years experience Assistant Plant Manager for large company in States. Last six years as Operating Manager for Company in Mexico. Working knowledge of Spanish.

BOX NO. Z-28, c/o Pit and Quarry Publications
431 South Dearborn Street Chicago 5, Illinois

POSITION WANTED

Quarry Superintendent

15 years Quarry experience, construction operation, maintenance gypsum, sand & gravel, limestone, ready-mix concrete.
College education, 38 years old, available.

BOX NO. Z-30, c/o Pit and Quarry Publications
431 S. Dearborn Street Chicago 5, Illinois

MASTER MECHANIC

Wanted top-grade master mechanic to handle well-equipped shop, repairing and maintaining permanent large crushing equipment, asphalt plants, ready-mix plants, heavy duty highway construction equipment and a fleet of 12 ready-mix and dump trucks both diesel and gas. Must have complete knowledge of this equipment, drive and administrative ability and willing to reside in Montreal, Canada. Salary will be in line with ability and experience.

Please send complete resume with first letter and approximate salary expected.

BOX NO. Z-22, c/o Pit and Quarry Publications
431 S. Dearborn St., Chicago 5, Illinois

DESIGN ENGINEER

The services of a design engineer, mechanical preferred, are required by large organization in Montreal, Canada. Must be thoroughly familiar with portable and permanent crushing plants, asphalt plants, ready-mix concrete plants and all types of road-building equipment, with eight or ten years' experience in this field and with engineering degree or equivalent. Permanent position if applicant qualified. Please give age, experience and references and state salary expected. All replies will be treated in strict confidence.

BOX NO. Z-21, c/o Pit and Quarry Publications
431 S. Dearborn St., Chicago 5, Illinois

DRAFTSMAN

Wanted a draftsman completely familiar with layout of large crushing plants, asphalt plants and ready mix plants as well as some familiarity with heavy road construction equipment. Job is permanent. Applicant should have at least from five to ten years experience in this type of work. Send complete resume of education and experience with first letter. Salary will be in line with applicant's ability and he must be willing to reside in Montreal, Canada.

BOX NO. Z-23, c/o Pit and Quarry Publications
431 S. Dearborn St., Chicago 5, Illinois

GRADUATE ENGINEER

The permanent services of a graduate engineer are required by a long established company in a Midwestern state. The applicant must have several years experience and complete working knowledge of the operations and equipment of a commercial rock quarry. Give age, experience, references and salary required.

BOX NO. Z-26, c/o Pit and Quarry Publications
431 S. Dearborn St., Chicago 5, Ill.

VAST AGGREGATE DEPOSITS NEAR TAMPA, FLA. FOR SALE

1—Excellent hard rock deposit meets State & Fed. Spec. Large amount 97% CaCoO. 2—Quartz gravel & sand deposit nearest other source 250 M. 3—Clay deposit suitable for light-weight aggr. 4—Clay suitable for brick mfg. 1 & 2, existing quarries in State unable supply demand; 1,000 ton daily possible within 75 M. radius. Great amounts now being imported from Ga., Ala., S. C. 3 & 4 none mfg. in State. Vast opportunities here for development of these newly discovered resources.

BOX NO. Y-22,
c/o Pit and Quarry Publications
431 S. Dearborn St., Chicago 5, Ill.

MACHINERY WANTED

Rock Products Equipment including Rotary Dryers, Crushers, Kilns, Filters, Vibrating Screens, Bins, Ball Mills, Power Shovels & Cranes, Conveyors, Diesel Engines.

Will consider closed plants or plants presently in operation.

Write giving full particulars to:

Box 430
1474 Broadway, N. Y. C.

VALUES IN USED EQUIPMENT

ENGINES

CATERPILLAR D318, six cylinder 100 H.P. with enclosed clutch, stub shaft and V-Belt pulley. This engine has been used but very little and is in wonderful condition.

I. H. C. Model UD14A—60 to 80 H.P. @ 1400 R.P.M. Equipped with enclosed clutch and stub shaft. Completely rebuilt this summer.

I. H. C. Model U21, Gas engine rated at 65 H.P. and equipped with twin disc clutch and stub shaft. Good operating condition.

MISCELLANEOUS EQUIPMENT

GRUNDLER Model 3XC Hammermill. Good condition throughout.

NELSON Model KB5 Bucket Type Loader. Has been rebuilt in our shops. An excellent loader in top condition.

BARBER-GREENE Model 82A Bucket Loader mounted on crawler tracks. Reconditioned and ready to go to work.

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LINK-BELT ¾ yd. Manganese front shovel bucket. Will fit any Link-Belt Speeder LS85 Shovel. Near New.

HENDRIX Model LS ½ yd. Dragline Bucket complete with all fittings. A-1 condition.

LINK-BELT complete shovel attachment for L40 machine. Good condition.

LORAIN complete shovel attachment for either TL20 or TL25 machines. Good condition.

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Call, Wire or Write for More Complete Details

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PIONEER 30"x42" r.b. Jaw Portable Primary Plant, mdl. 56A, w/ 42"x14' grizzly apron feeder, hopper, undercrusher conveyor, by-pass chute, mounted Athey crawler tracks. 95% new. $15,500.00 or $19,000.00 with Cummins H.P.600 Diesel power. Bargain.

IOWA 20"x36" r.b. Jaw Portable Primary Plant, w/apron feeder, undercrusher conveyor, power unit, pneumatic tires. $12,500.00.

IOWA 25"x40" Jaw Portable Primary Plant — as above — $18,500.00.

PIONEER 39V Portable Gravel Plant, w/10x36 Jaw, 30x18 rolls, screen, Cat. 13000 diesel, conveyors, feeder, pneumatic tires. A1. $21,000.00.

IOWA CCC Portable 40x24 Double Roll Secondary Plant w/screen, Murphy ME650 power unit, conveyors. Used 45 days. $28,500.00. Cost new $45,000.00.

DIXIE 36-50 Portable Hammermill Plant w/underconveyor, pneumatic tires. Excellent. $4,500.00.

UNIVERSAL 20"x36" r.b. Jaw, new. $6,500.00.

HAMMERMILLS, Iowa #4033 & #3033, Dixie 30-33.

PIONEER 24"x18" r.b. Double Roll. A1. $1,750.00.

CONVEYORS 24"x70', 24"x44' & 30"x84' lattice 60% new price.

SCREENS, Seco 4x15 2-deck & 4x10 3-deck.

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Telephone Harrison 0021

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1—20,000# Allis-Chalmers, Dbl Drum
1—26,000# Nordberg, Sgl Drum
1—26,000# Vulcan, Sgl Drum AC with MG Set Complete
1—11,000# Wellman, Sgl Drum AC
1—16,000# Allis-Chalmers, Sgl Drum
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1— 6,000# Brownie Carspotter AC
1— 5,000# Link-Belt Carspotter AC
1—20,000# Amer. Hoist Carspotter AC
1—20,000# LB Endless Puller

CRUSHERS & MISC.
1—36x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
1—18x20 Eagle Dbl Roll
1—420'x20" SA Comb. Scraper & Bucket Conveyor or w/o MT'r. Ideal for tipple or dock.
2—24"x60' SA porta. conveyors, AC mt'r
1—(New) NOLAN Porta. feeder
1—22"x66" SD-RS Roots Connersville Positive Pres. Blower output 45 CF per. Rev. Complete with 100 hp. AC MT'r and controls.
1—3 yd. Sauerman Scraper Bucket System
1—75'x28'x30' High Steel Building

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2—EUCLIDS, Model 9 FDT Tractors with 58 W Bottom Dump Trailers — CUMMINS DIESELS. Excellent Condition, and Excellent Rubber.

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QUALITY EQUIPMENT PRICED RIGHT

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10'x90'x9/16" Allis-Chalmers.
8'x80'x¾" Vulcan.
7'x160'x⅝" (2).
7'6" & 6'6"x120'x⅝".
7'x120'x⅜". (2).
7'x60'x⅜" with lifters.
6'x27' Louisville, 4½" SS tubes.
6'x60'x⅜".
502-20 Roto-Louvre.
5'x30'x⅜" Ruggles Cole.
4'6"x50'x¼" with lifters.
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MILLS

5'x22' Smidth, Tube.
23"x12' double shaft, L. B. Pug.
10'x48" Hardinge.

MISCELLANEOUS

5" Fuller-Kinyon Pump.
Magnetic Belts.
Bucket Elevators.
Belt Conveyors.
Screw Conveyors.
36"x34' Apron Conveyor.

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HANOVER 2-4890
Machinery & Equipment Merchants

CRANES: 2—Overhead Electric Traveling Cranes, 7½ ton, 80 ft. span, 4 motor, bucket handling with or without Hayward 2½ yd. class E, clam shell buckets, or Blaw Knox 2½ yd. bucket type 730-W, 440 volt, 3 phase, 60 cycle. One crane available now, one January 1953.

LOCOMOTIVE CRANE: 25 ton capacity, thoroughly modern gasoline powered, cast steel trucks, air brakes, bucket operating, with or without 2½ yd. Williams clam shell bucket.

COMPRESSOR: Worthington DC2, 29/18½ x 21, motor 600 H.P. synchronous, 440 volt, with all auxiliary equipment.

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DIESEL MOTOR: Caterpillar D13000 portable on skids, 122 H.P.

KILNS: 2—Modern, 5' x 255 ft., complete with auxiliary equipment. Condition like new.

PULVERIZERS: Hardinge 5' x 22", steel lined, Ball Mill complete with disc feeder and 30 H.P. motor. Also, one 8' x 36" and one 10' x 48", new condition, complete with motors and equipped for dry grinding. One Marcy 8' x 12' Rod Mill, double end, center discharge, 300 H.P. motor. One Marcy 4' x 5' Ball Mill, NEW.

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WE BUY AND SELL EQUIPMENT THROUGHOUT NORTH AND CENTRAL AMERICA.

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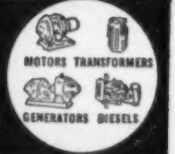
Lansdowne, Pa.
Phila. Phones: MAdison 3-8300—3-8301

WORLD'S LARGEST INVENTORY
NEW AND GUARANTEED REBUILT EQUIPMENT



WRITE, WIRE OR PHONE
ELECTRIC EQUIPMENT CO.
L. D. (Long Distance) 65
ROCHESTER 1, NEW YORK
Explosion Proof Motor Headquarters

FOR SALE

One Gates, Style D Crusher, No. 6-K-6375.

Parts for same:

One Set Concaves	New
One Set Mantles	Good
One Used Excentric	Good
One Pinion	New
One Brass Wearing Ring	New
One Set Long Excentric Bolts	

One Gates, Style D Crusher, No. 8-L-4898.

Parts for same:

One Extra Shaft	Good
One Head (Smooth)	New
One Set Concaves	New
One Used Excentric	Good
One Pinion	New
One Extra Drive Shaft & Pinion	Good
One Set Mantles	Good
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We offer the No. 6-K-6375 for $4500.00 and the No. 8-L-4898 for $7500.00, (all spare parts included) f.o.b. cars or truck, our plant, Cape Girardeau, Missouri. Subject to prior sale & delivery can be made after January 1st, 1953.

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Camargo, Oklahoma

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c/o PIT AND QUARRY PUBLICATIONS
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Alternator 40 hp. 115 volts, 450 volts, 3 phase 31.3 KVA
Gruendler 2XA anti friction pulverizer
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Stedman B-30 hammermill, 30"x24"
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Power & Mining double roll crusher, 24" dia. 14" face
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Bonded Scale 12"x16" double roll cinder crusher
Jaw crusher Climax 10"x16"
Five overhead electric AC hoists
Chicago, size 12, 3 ton airhoist
Double drum tandem hoist
Electric 15 hp. car puller
Sullivan HE 7½ hp. electric hoist
Jeffrey 30" wide 30' long apron conveyor in frame
Bartlett-Snow revolving dryer, 3'x17'
Merrick Scales for 16" and 30" belt
Screw conveyors and vibrating feeders
Enclosed ceiling conveyor, 14" flat belt
New & used vibrating screens
Motors, reducers, engines, gears, V belt drives
New 14", 16" and 18" ball bearing trough idlers
42" belt conveyor equipment for 200'
36" belt conveyor equipment with belt for 350'
30" belt conveyor equipment with belt for 500'
24" x 27' steel framed trough belt conveyor
20" x 200' flat belt conveyor parts
New and used conveyor & elevator belt
Enclosed 10" and 12" bucket elevators
Enclosed 14" bucket elevator, 42' center
Enclosed 16" bucket elevator, 40' center
Open 16" spaced bucket elevator, 92'
Cont. 12" and 14" bucket elevator, 50'
Open bucket elevators on chain or belt
Vertical hydraulic press, 250 ton cap.

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136 Coit St., Irvington, N. J.

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1—5 x 60 ft. Kiln brick lined with motor and drive.....$2850.00
1—5 x 50 ft. Kiln brick lined with motor and drive.....$2500.00
1—3 x 32 ft. Rotary Cooler not lined with motor and drive.....$750.00
1—10 ft. Gaco Air Separator with motor and drive.....$1000.00
1—5 x 14 Tube Mill silex lined with motor and drive.....$1500.00
4—9 x 24 ft. Steel Vertical Bins. Each $250.00

Above located Chubbuck Lime Plant near Cadiz, California.
1—2' Symons Cone Crusher
1—66" Pacific Hoe Type Scraper
1—48" x 16' Heavy Air Receiver
1—#64½ Marcy Ball Mill

WESTERN MACHINERY COMPANY
Phoenix, Arizona
P. O. Box 3465 **Ph. AL-3410l**

FOR SALE

Dorr Co. Rake Classifiers—over end feed:
3 machines 16' 8" x 4'
1 machine 16' 8" x 3'
In excellent condition. Offered without motors.

WHITEHEAD BROTHERS COMPANY
324 West 23 Street **New York 11, N. Y.**

QUARRY EQUIPMENT

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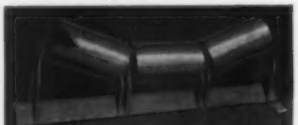

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18" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
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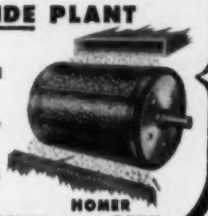

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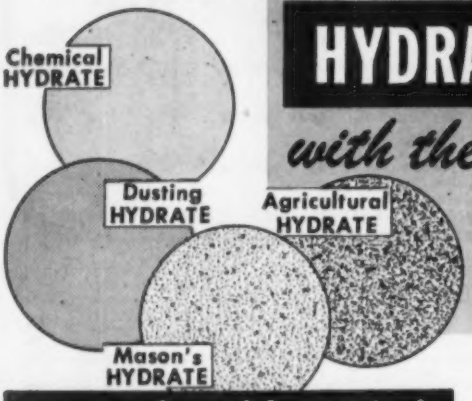
Produce UNIFORM Grades of HYDRATED LIME *with the Raymond* AUTOMATIC PULVERIZER



ALL Grades with ONE Unit

THE Raymond Automatic Pulverizer offers special advantages in the production of superior quality lime at a record low cost per ton:

One unit of equipment handles the complete operation of disintegrating, classifying and conveying the hydrated lime, as well as rejecting impurities from the finished product.

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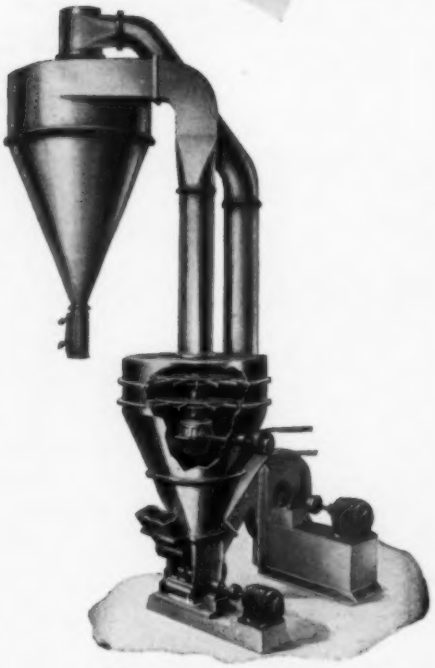

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PULVERIZER DIVISION

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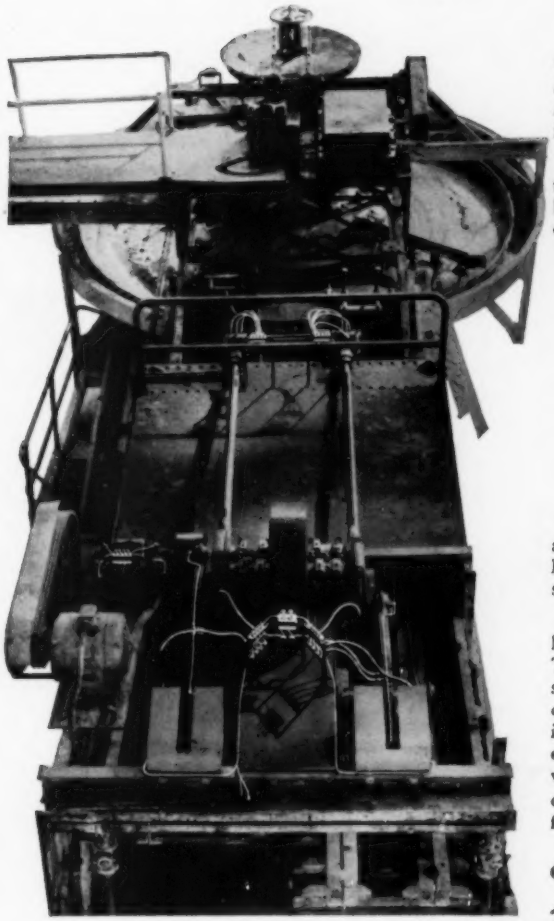
FARVAL—*Studies in Centralized Lubrication* No. 124

IN SOUTH AFRICA

Farval speeds gold production, saving lubricants, labor and bearing expense



Farval installation on a Dorr Bowl Classifier at a gold mine in Transvaal, South Africa. Note the unusual method of mounting the 4 groups of valve blocks on special frames above the machinery.

● Pressed for more production, equipment at South African gold mines is operated around the clock. Any shutdown, as for lubrication or bearing repair, interferes seriously with gold output.

This need for uninterrupted operation led to a trial installation of Farval Centralized Lubrication by one company on a Dorr Classifier. Benefits were obvious immediately:

1. It is no longer necessary to shut down equipment to lubricate it.
2. Certain difficulties in gold extraction, formerly caused by presence of surplus grease are eliminated.
3. Dust containing cyanide is kept out of the bearings, thus reducing wear and saving repairs.
4. Lubricating labor is saved.
5. Waste is eliminated, with a consequent saving in grease of approximately 80%. This saving alone pays for the installation of Farval.

Results have been so amazing that, one after another, gold mining companies have tried out Farval Centralized Lubrication and then installed systems widely throughout their plants.

Farval is the original Dualine system of centralized lubrication, proved practical in 20 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

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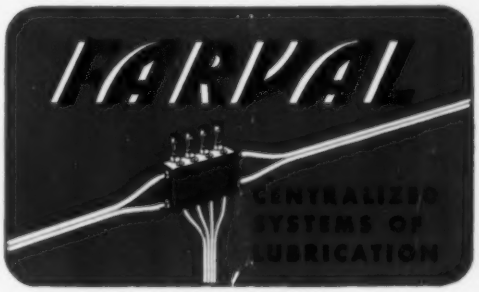
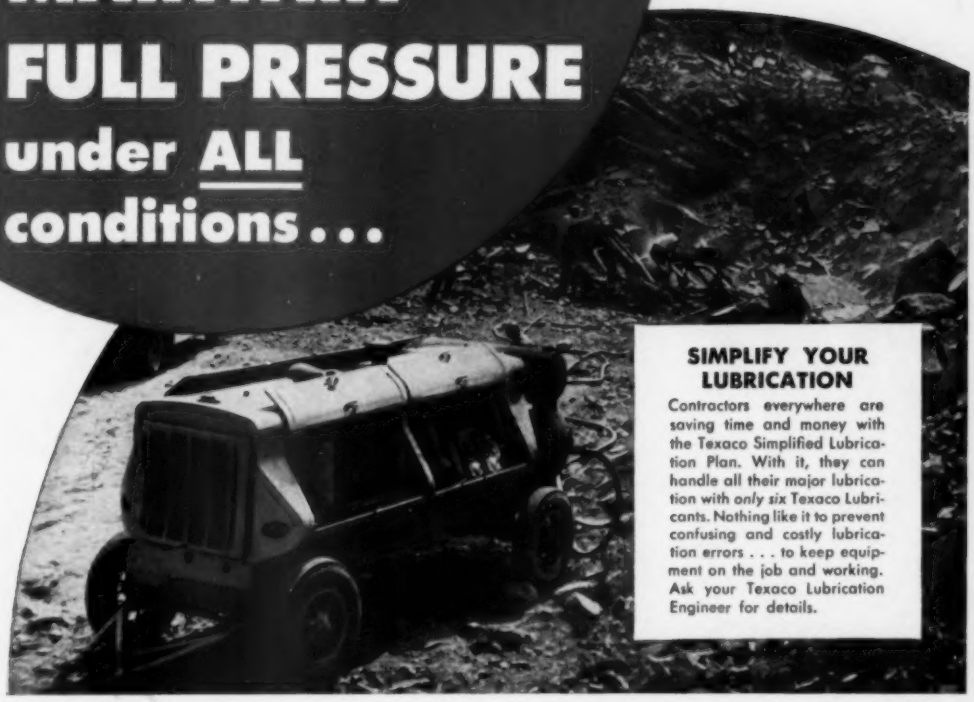
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



MAINTAIN FULL PRESSURE under ALL conditions...



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FOR YOUR ROCK DRILLS use *Texaco Rock Drill Lubricant EP*. You get superior lubrication, plus longer drill life and reduced maintenance costs because of its "extreme pressure" properties. In addition, it protects against rust whether drills are running or idle.

A Texaco Lubrication Engineer will gladly help you select the proper lubricants to get top performance from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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